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ON THE HEALING OF ASEPTIC BONE CAVITIES BY IMPLANTATION OF ANTISEPTIC DECALCIFIED BONE.

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The antiseptic treatment of wounds as now almost universally practised constitutes the greatest triumph of modern surgery. Since this treatment has become developed to its present state of perfection primary union is no longer the exception, but the rule. The failure to obtain healing by first intention of an intentional wound made by the knife of the surgeon through aseptic tissues, or of a recent accidental wound, in which parts of the same anatomical structure can be approximated and coaptation uninterruptedly maintained, must be looked upon as an evidence of a faulty technique or want of proper care on the part of the surgeon or his assistants in carrying out the principles of antiseptic surgery. Primary union in the sense in which this expression should be now used means the restoration of injured or lost parts without suppuration. It is a purely reparative process in which all the newly formed tissues are utilized in permanently cementing together divided parts or in restoring tissues lost by injury or disease. If a definitive union or repair is accomplished without suppuration, it must be called primary union whether this result has been obtained with or without visible granulation tissue.

An ideal primary union is one where the surface and deep parts can be brought together and held in perfect approximation until in a few days, by interposition of new living tissue between the divided structures,

the interrupted anatomical continuities have become permanently restored and the suspended physiological functions established. Practically such a result is not often obtainable. Even the most improved methods of approximation and coaptation frequently fail in securing such accurate apposition of similar tissues as to enable organic union to take place in such a short space of time and accomplished by such a small amount of reparative material. Under most circumstances spaces are left here and there between the surfaces of the wound which are first occupied by blood or serum and later by granulation tissue, which in the course of time is transformed into cicatricial tissue and by its contraction unites or brings in closer contact the divided tissues.

The time required for the definitive healing of a wound, other things being equal, will therefore depend largely upon the accuracy with which coaptation can be effected and maintained. In wounds with considerable loss of tissue, and in the healing of cavities with rigid, unyielding walls where coaptation of surfaces which it is the intention to unite, for physical reasons is rendered impossible, we have to rely upon the process of granulation in effecting repair and in restoring interrupted continuities. Under the old treatment the healing of wounds by secondary intention was often prolonged for an indefinite period of time because under the influence of pus microbes or their ptomaines the embryonal cells of which the granulation tissue is composed were transformed into pus corpuscles, and thus the reparative process was delayed until the infective process had exhausted itself, as it were, or until the granulation tissue was in a condition to resist successfully the deleterious effect of pus microbes or their products.

The most signal success of the antiseptic treatment has been obtained in the repair of parts where healing has to be accomplished by the formation of an extensive mass of granulation tissue. If an aseptic condition is maintained throughout, all of the granulations are transformed into tissue of a higher type and extensive defects are healed in a few weeks under a single dressing. Primary healing of an empty large cavity with unyielding walls, even without suppuration, requires often weeks and months, and not infrequently is but incompletely accomplished, as the granulations find no temporary support, and from the absence of such support the process comes to a standstill, while epidermization takes place on its surface *pari passu* with the disappearance of the temporary bloodvessels in the deeper parts which are undergoing cicatrization. When the healing process is finally completed it is at the expense of a considerable loss of substance. Such difficulties are almost invariably met with in the treatment of bone cavities.

I purpose to describe a new method of treatment which I have found exceedingly useful in overcoming the obstacles to favorable and rapid healing by granulation in such cases. Before giving a description of

this method I will call attention to a number of attempts made in the same direction during the past.

A few years ago Dr. Neuber, then assistant to Professor von Esmarch, of Kiel, introduced a method which was intended to secure a speedy definitive healing of the wound without aiming at reproduction of the tissues destroyed by the disease or removed by the operation. It consisted in fully exposing a tuberculous depot in bone or an osteomyelitic deposit, after thorough removal of the products of inflammation with spoon, gouge, or chisel, and chiselling away the margins of the cavity sufficiently to permit the soft parts to be turned inward, thus covering the entire surface of the denuded bone. The cavity was thoroughly disinfected before the flaps were implanted. The flaps were fastened with bone nails. In case the cavity was limited, and, as is so often the case near a joint, the skin flap was made in such a manner that the base was directed toward the joint. In diffuse osteomyelitis of the long bones a gutter was chiselled out and the flaps on each side turned inward in such a manner that their margins came in contact in the bottom of the gutter. Two great objections can be raised against this method:

1. It requires the removal of an unnecessary amount of healthy bone in order to enable implantation of the skin flaps.

2. As the result of tension from fixation of flaps, pressure on the part of the dressings, and more particularly on account of a serious diminution of the vascular supply of tissues predisposed by antecedent disease, gangrene of the flaps has frequently occurred.

I gave this method a fair trial in a number of cases, but I never obtained an ideal result—that is, primary union between flaps and between flaps and the subjacent bone. In a number of cases gangrene of some portion of the margins of the flaps occurred, leaving defects which required a long time to become repaired by a slow process of granulation, cicatrization, and epidermization. This method has a legitimate sphere of usefulness and application in cases of superficial osteomyelitis followed by necrosis, but should never be employed if the disease is centrally located, requiring in its operative treatment the formation of a deep gutter. The next idea that presented itself was to utilize a blood-clot for the purpose of expediting the definitive healing of bone cavities. Years ago Lister observed that under the antiseptic dressings in aseptic wounds coagula between the surfaces of the wound did not undergo putrefactive or degenerative changes, but as he believed, and asserted, became supplied with bloodvessels and were organized. A few weeks after the operation or accident which inflicted the wound he saw that the blood-clot had undergone vascularization and presented other evidences of organization.

In 1876 Lesser visited Lister's wards and made a special study of the organization of blood-clots in aseptic wounds, and reported the results of

his observations in the *Deutsche Zeitschrift f. Chirurgie*, vol. iii. Neuber, as early as 1879, after operations for necrosis, allowed the cavity to fill with blood with the expectation that the same favorable conditions could be secured for the blood-clot by thorough antisepsis as in recent wounds, but the results in these cases were so unsatisfactory that he soon abandoned the idea.

In the admirable paper of Professor von Volkmann, read at the London meeting of the International Medical Congress, special attention was called to the part taken in the healing process of the blood-clot between the fragments in compound fractures. At the end of six weeks he found at the site previously occupied by the coagulum living vascular tissue. Watson Cheyne gives a full description of the organization of blood-clots in recent wounds in his work on *Antiseptic Surgery*.

T. B. Hamilton (*Journal of Anatomy and Physiology*, vol. xiii., 1879; *Edinburgh Medical Journal*, November, 1881, p. 385) substituted for the blood-clot aseptic sponge, as he found that this substance was promptly removed by absorption in aseptic granulating wounds. Sponge-grafting was for a time quite extensively resorted to in hastening the process of repair of hollow wounds in soft parts, but, to my knowledge, was seldom practised after operations on bone.

In a paper read at the meeting of the German Congress of Surgeons in 1886 ("Ueber Heilung von Wunden unter dem feuchten Blutschorf") Schede described what he deemed a new method of treating wounds where accurate coaptation of the parts could not be secured. Schede's method consists in a careful conservation of the blood-coagulum combined with the completion of the healing process under a moist blood-crust. For instance, in operating on a long bone for necrosis, osteomyelitis, or any other lesion centrally located requiring in the removal of the pathological product the formation of a cavity, he renders the part bloodless by applying an Esmarch's constrictor on the proximal side, and, after having removed the dead bone or diseased tissue, he disinfects the cavity thoroughly and then sutures the soft parts in such a manner that a space is left open at a point corresponding to the summit of the cavity. This insures complete filling of the cavity with blood after the removal of Esmarch's bandage. No drainage-tube is introduced. The wound is covered with a strip of protective silk, over which is applied a copious absorbent antiseptic compress. The bandage for retaining this dressing is not firmly applied, in order that a sufficient amount of bleeding may take place to fill the cavity. The protective silk prevents the drying up of the exposed portion of the clot and secures at the surface of the wound the formation of the moist blood-crust, upon the presence of which so much stress is laid by the author for the subsequent favorable and rapid healing in the depth of the wound.

Schede's experience with this method of treatment has been exceedingly favorable. Small cavities in bone he has healed completely in from twelve to fourteen days, while large cavities required from three to six weeks. In some instances this treatment proved a failure even in his hands, and in these cases the unfavorable result could sometimes be traced to an inadequate hemorrhage, the cavity filling only partly with blood. When imperfect filling of the cavity with blood was found the cause of failure of the entire cavity closing under one dressing, the healing was found to have proceeded only as far as the coagulum reached, and the balance of the cavity closed later by the usual tedious process of granulation from the wound surfaces and the upper surface of the granulation mass. In operations for tuberculous affections of bone he found not infrequently a recurrence of the disease in the cicatrix of the wound which had healed by primary union. In severe cases of general tuberculosis the so-called organization of the coagulum did not take place. The author insists that only clean and aseptic wounds are adapted to this form of treatment. In cases where it is impossible to secure asepticity of the bone cavity, or where the primary treatment failed, he waits until suppuration has ceased, and then, by scratching the granulation surfaces, obtains enough blood to fill the cavity and then applies the same dressing as in recent cases. A number of cases are reported to show that this plan has proved successful.

In the discussion which followed the reading of this paper, von Bergmann reiterated his views that he had so strongly expressed on a previous occasion, that in the treatment of all wounds it should be the surgeon's imperative duty to effect complete hæmostasis, as the accumulation of blood in wounds renders antiseptic treatment more difficult and less efficient. Volkmann stated that he did not believe in the transmutation of blood as a tissue, as extravasated blood is removed by absorption and gradual substitution on the part of the granulations. He favors moderate compression of the wound, so as to prevent unnecessary loss of blood, as the escape of blood beyond what is necessary to fill the minute spaces between the wound surfaces is unnecessary and injurious.

At the meeting of the German Congress of Surgeons last year, Lauenstein ("Zur Heilung der Wunden unter dem feuchten Blutschorf") read a paper on Schede's treatment of wounds, wherein he compared the healing under a moist blood-crust to the healing under a dry crust as described by John Hunter. He regards the superficial portion of the coagulum in the light of an occlusive dressing. During two years he resorted to this treatment in seventy-four cases, with the result that in sixty-four it proved successful, and proved a failure only in ten. A cavity in the head of the tibia the size of a walnut, caused by the removal of a tuberculous deposit, he found completely healed under one dressing after three weeks. In four operations for extensive necrosis

the treatment failed. In one case coagulation of the blood in the cavity failed to take place, a circumstance which he attributed to imperfect antisepsis, and yet the final result was favorable.

Schleich has studied this subject experimentally, and, as the result of his observations, he claims that the aseptic coagulum must be considered as a porous organic substance which, by compression, occlusion, and by diminishing wound secretion, places the cavity in which it is located in a more favorable condition for healing.

Landerer asserts that extravasated blood takes no active part in the healing of a wound, and he attributes Schede's success more to faultless antiseptic measures than the presence of the coagulated blood. In the light of modern research, it must be conceded that, when blood escapes from vessels into the tissues or accumulates between the surfaces of a wound, it has lost its physiological functions and has become a foreign substance. If the blood and its surroundings remain in an aseptic condition, it is removed sooner or later by absorption on the part of the granulations which take its place by substitution. The blood-coagulum in Schede's treatment of wounds serves as a temporary nidus for the granulations which permeate it from all directions, thus placing the cavity in a condition capable of becoming filled with a mass of active granulation tissue and a reticulum of bloodvessels, which furnish ample nutrition for the growth and development of the new tissue while the blood is removed by the encroaching granulations. A hollow, empty space, particularly in a bone, where its walls are firm and immovable, presents the most unfavorable conditions for healing by the process of granulation. As the granulations and vessels have no support toward the centre of the cavity, the defect is repaired in a slow and unsatisfactory manner. The deeper portions of the granulation tissue undergo transformation into tissue of a higher type, and, while this change is undergoing perfection, the vascular supply toward the surface is diminished by disappearance of many of the new temporary vessels, and the conditions for the growth and development of the granulations are correspondingly impaired. A coagulum, as long as it remains aseptic and sufficiently firm, furnishes an admirable support for the granulations and delicate new bloodvessels, and constitutes the direct means by which the entire cavity is filled with active and exceedingly vascular granulation tissue in a remarkably short time. Schede's treatment marks a decided advancement in the treatment of bone cavities, but is open to the following objections:

1. It implies an unnecessary loss of blood, which, in some cases at least, must be detrimental to the patient. The loss of from two to eight ounces of blood required to fill a bone cavity in an anæmic child or a marantic adult might result in a collapse which a careful hæmostasis would have prevented.

2. The blood-coagulum is at best but an aseptic substance. Careful hæmostasis is one of the essential requirements of good surgery. Perfect asepsis is not always attainable. Recent experiments have demonstrated the fact that pathogenic microbes are more likely to become the cause of disease when they come in contact with substances that serve the purpose of a culture soil. Coagulated and fluid blood, at the temperature of the body, furnish an admirable culture substance for a number of the most dangerous varieties of pathogenic microbes. In case perfect asepsis is not obtained, the coagulum of necessity must become a source of danger.

3. The bleeding may not be sufficient in quantity to fill the entire cavity. In such cases the prompt and early production of embryonal tissue will be limited to the size of the coagulum, and the balance of the cavity has to close by the ordinary slow process of granulation and cicatrization.

4. The extravasated blood may fail to undergo coagulation, and fluid blood would not form a good medium for the rapid diffusion of the granulations throughout the entire cavity.

It occurred to me that if in the healing of bone cavities an absorbable, firm, antiseptic substance could be substituted for the coagulum, it would present a number of advantages not obtainable by Schede's method. The substance which I selected for my experimental and practical work was thoroughly decalcified bone, rendered not only completely aseptic, but *thoroughly antiseptic* by keeping it immersed for a considerable length of time in sublimate alcohol (1 : 500). Before the removal of Esmarch's bandage, and after thorough disinfection of the cavity, its walls and the bone chips are lightly dusted with iodoform before implantation is made. The wound is completely closed, with the exception of the lower angle, where a capillary drain of a few threads of catgut is introduced. I shall first describe the details and the results of my experimental work. All of the experiments were made under strict antiseptic precautions. The part to be operated on was shaved, thoroughly washed with warm water and potash soap, and disinfected with a 1 : 2000 solution of sublimate. The same solution was used for irrigation during the operation. The bone was exposed by a straight incision, and after reflecting the soft parts the bone defect was made either with a trephine or chisel, the former instrument being used mostly in the operations on the skull and the latter in excavating the long bones. The operations on the extremities were rendered bloodless by using elastic constriction. In all instances the cavity was filled by a piece of well-decalcified antiseptic bone, which was so cut as to fit the cavity as accurately as possible. In some cases the bone plate, after implanting it in a trephine opening, was fastened in its place by driving two or more small aseptic steel nails into the margins of the opening. Before

implantation the cavity and the bone plate were dusted with iodoform. The external wound was completely closed, without making any provision for drainage. Where the fact is mentioned the plates were perforated with numerous small openings, so as to enable the granulations to penetrate it more readily and thus expedite the process of absorption and substitution.

I. Implantations of Decalcified Bone-disks after Trephining of the Skull.

Exp. 1.—Dog, weight fifteen and a half pounds. Operation Nov. 13, 1887. A disk of bone was removed from each side of the longitudinal sinus with a trephine three-quarters of an inch in diameter at a point corresponding to the junction of the anterior with the middle portion of the cranial vault. From the right opening a profuse hemorrhage occurred, which had to be arrested by plugging it firmly with iodoform gauze, which was left in the wound. A circular piece of decalcified bone, corresponding in size to the trephine opening, rendered strongly antiseptic by several days' submersion in a 1 : 500 solution of sublimate in alcohol and by sprinkling it with iodoform, was implanted. The thickness of the disk corresponded to the diameter of the cranial bones at the site of operation. The piece of bone was driven into the opening with a hammer, so as to secure fixation by pressure. The antiseptic dressing was retained by plaster-of-Paris bandage, which was made to encircle the entire head. Primary healing of wound. No untoward symptoms. Dog killed forty-four days after operation. Brain adherent to dura on left side. Left trephine opening closed by a firm cicatricial mass, corresponding in thickness to the cranial bones. External margins of this opening little, if any, bevelled. Cicatrix not translucent. The opening in the skull considerably diminished in size by new bone deposited upon its margins. Right opening appears somewhat enlarged externally by absorption of margins, giving it a strongly bevelled appearance. The centre of the thin membrane closing the defect in the skull translucent, and at this point slight bulging in outward direction.

Exp. 2.—Old dog, weight fifteen and a half pounds. Operation same as in the first experiment. Right trephine opening plugged with a circular decalcified bone-disk. From the left opening profuse hemorrhage, caused by injury of a large vein contributory to the longitudinal sinus. As the bleeding did not yield to compression, it was finally arrested by irrigation with hot water. Wound healed by primary union. Animal killed at the end of three months. Examination of the skull showed on the right side that the opening in the bone was considerably diminished in size, the balance of the defect being closed by a firm circular membrane seven-sixteenths of an inch in diameter, presenting in the centre and toward the left side a translucent point. Left opening about the same, only that the defect in the bone was somewhat larger, the membrane somewhat thinner, and the surfaces not as smooth as on the opposite side.

Exp. 3.—Young dog, weight seventy and a half pounds. In this case two disks of bone were removed on each side of the middle line, and the two openings transformed into an oblong defect, one and a half by three-quarters of an inch, by the use of a chisel. On the left side free hemorrhage from a small artery in the dura mater, which was arrested by plugging the opening firmly with a plate of decalcified bone corresponding in shape and size to the piece of bone removed. Slight suppuration from the surfaces of the wounds. Killed four weeks after operation. Right opening not diminished in size; closed by a thin translucent membrane; external margins strongly bevelled. Left opening closed by new bone, with the exception of a space one-third of an inch in diameter, which is occupied by a thick, firm membrane.

Exp. 4.—Old dog, weight fifty-nine pounds. On the left side of the median line of the cranial vault a portion of the bone, one and a half

inches in length and three-quarters of an inch in width, was removed with trephine and chisel, and closed with an accurately fitting plate of decalcified bone. Hemorrhage was very profuse from the large veins of the diploë, but was promptly arrested by the bone implantation. Slight suppuration in the superficial portion of the wound. Animal killed seventy-five days after operation. The opening in the skull was found greatly diminished in size by the formation of new bone from the margins. The defect was closed by an oval, thick, and firm membrane one and three-eighths inches in length and three-eighths of an inch in width. Margins of opening in the bone bevelled at the expense of the external table.

Exp. 5.—Old dog, weight forty-four pounds. Three disks of bone were removed with the trephine on the left side and parallel to the sagittal suture. These openings were transformed with the chisel into an oblong space one and one-fifth inches long and three-quarters of an inch wide. The hemorrhage from the bone was very profuse and could only be arrested by the implantation of a closely fitting decalcified plate of bone. The animal was stupid and disinclined to move for four or five days. At the end of the first week the dog appeared as lively as before the operation. The skin at the site of operation was raised, and underneath it a fluctuating swelling could be felt. The sutures were removed, and on opening the posterior angle of the wound about two fluidrachms of a sero-sanguinolent fluid escaped. Two weeks after the operation it was ascertained that the dog had become deaf, otherwise the recovery was complete. The deafness remained at the time the animal was killed, seventy-two days after the operation. The anterior portion of the defect in the skull was closed by a firm membrane, to which the brain was adherent over a surface the size of a split pea. The defect in the bone measured one and one-fifth of an inch in length, posteriorly two-fifths of an inch in width, while anteriorly the bony margins were only distant one-third of an inch. Membrane nearly as thick as the surrounding bone. These appearances indicate that the defect in the skull had been considerably diminished by ossification proceeding from the margins of the opening.

Exp. 6.—Young dog, weight fourteen and one-third pounds. One disk of bone removed with trephine from left side well under the temporal muscle. Opening plugged with a disk of decalcified bone. Primary union of wound. Animal killed seventy-two days after operation. Osseous defect greatly reduced in size, as the circular thick membrane which was present in the centre of the opening measured only seven-sixteenths of an inch in diameter.

Exp. 7.—Old dog, weight fifty pounds. On the left side, some distance from the sagittal suture and parallel with it, three disks of bone were removed with the trephine, and the two anterior openings made into an oblong space with the chisel. In the posterior opening the inner table was left *in situ*, on account of its being directly over the lateral sinus. The hemorrhage, which was quite profuse, was arrested by means of hot-water (120° F.) irrigation. In this instance the decalcified bone-plate was fixed in its place by driving an aseptic steel nail into the margins of the opening at either extremity. Considerable swelling of soft parts at the time the sutures were removed; later, a slight discharge from wound. The animal never showed any signs of cerebral disturbance, and was killed eight weeks after operation. In the centre of the cicatrix the brain was found adherent over a limited surface. Nails not found, and are supposed to have escaped through the wound at the time it was discharging. Posterior third of defect closed by bone which presented a rough appearance externally and was nearly as thick as the surrounding bone. Anterior two-thirds of the opening occupied by a thick membrane, five-eighths of an inch in length, which was traversed by spurs of bone from opposite sides, so that at some points the new bone seems to bridge the defect completely. This specimen presents a beautiful illustration of advanced substitution of the decalcified bone-plate by osteoplastic material from the margins of the opening.

Exp. 8.—Young dog, weight fifteen pounds. In this instance the trephine was applied too near the frontal sinus, and on removing the disk of bone

it was found that this structure had been opened. The opening in the sinus was plugged with a piece of iodoform sponge, and another disk of bone was removed immediately behind the first opening, and the intervening projections of bone removed with the chisel. The plate of decalcified bone was fastened with two small steel nails. Some suppuration from the anterior angle of the incision followed, and the nails undoubtedly escaped through this opening. As suppuration continued, the bone-plate was removed and the wound was thoroughly disinfected, and a new plate introduced two weeks after the operation. After this the wound healed rapidly. Animal killed one hundred and four days after operation. At the anterior angle of the wound a small opening led directly into the frontal sinus. The oval defect in the bone was occupied by a dense, firm membrane one inch long and half an inch wide, presenting two translucent points near its centre.

Exp. 9.—Old dog, weight thirty-nine and a half pounds. With the chisel a portion of the cranial vault, one and four-fifths inches in length and three-quarters of an inch in width, was removed on the left side of the skull some distance from the sagittal suture. The hemorrhage from the dura mater was profuse, and resisted the ordinary hæmostatic measures, but was finally controlled by an application of the actual cautery. The plate of decalcified bone which was implanted was perforated by numerous small openings, for the purpose of facilitating the penetration of granulation tissue. The plate was fastened in its place by two steel nails. No unfavorable symptoms. Animal killed thirty-two days after operation. The opening in the skull was found closed by a thick, firm cicatrix, corresponding in thickness to the diameter of the cranial bones. Formation of new bone had diminished the opening to a space one and three-tenths of an inch long and three-eighths of an inch wide. Nails encysted, the one in the anterior margin being firmly and immovably fixed in the bone, while the one in the posterior margin had become somewhat loosened.

Exp. 10.—Dog, weight twenty-two pounds. An area of bone, one and three-quarters of an inch in length and eighty-six one-hundredths of an inch in width, was removed with trephine and chisel on the left side of the skull. A dural vessel which bled profusely was ligated with fine silk. A perforated plate of decalcified bone was implanted. The operation was followed by suppuration and suppurative pachymeningitis, which resulted in a subdural abscess and perforation into the longitudinal sinus, in consequence of which the dog died eight days after operation. The specimen is preserved for the purpose of showing the method of implantation after trephining.

These experiments demonstrate the value of implantation of a disk or plate of decalcified bone after operations on the skull where re-implantation of the bone removed cannot be practised. It is applicable in cases where loss of bone has been sustained by injury or after operations for osteomyelitis, tumors, or syphilitic or tuberculous disease of the cranial bones. Implantation of decalcified bone prevents direct union between the pericranium and the brain or its envelopes. The implanted bone is removed by the granulation tissue which forms all around it, and thus a large mass of embryonal tissue is interposed between the soft tissues covering the skull and the underlying coverings of the brain, a condition which is favorable to the formation of new bone at the site of the operation. In all instances where this procedure was resorted to, the defect in the skull had been more perfectly repaired than on the opposite side, where the soft parts were brought in direct contact with the cranial contents. In cases where the trephine disks or the chips of a chisel operation are aseptic and healthy, Macewen's method of re-implantation

should be done; but where this plan cannot be followed, implantation of decalcified bone constitutes the best substitute.

Aside from favoring the process of osteogenesis, the bone-disk answers a most useful purpose in affording protection to the brain, and in arresting hemorrhage from the vessels of the diploë. It is unsafe to rely upon the hæmostatic effect of the implanted bone when the hemorrhage takes place from the surface of the dura mater, as in such a case there is danger arising from compression of the brain from a blood-clot forming between the disk and the dura mater, but when troublesome hemorrhage is encountered from the vessels of the bone, it is promptly arrested by pressure made by the implanted disk. If the implantation is intended to act as a hæmostatic, then the plate of bone should fit the opening closely, so as to exercise direct compression against the orifice of the bleeding vessel. Bone, when thoroughly decalcified, is an elastic substance, and can be readily compressed at the time of implantation. I am strongly impressed with the advantages to be derived from multiple perforations in the disk, as the perforations, in the first place, afford free drainage to the space between the dura mater and the disk; secondly, they increase the elasticity and compressibility of the disk; and, thirdly, they expedite the removal of the disk by absorption and substitution by the granulation tissue. For the purpose of retaining the disk in place after implantation, one of two expedients may be resorted to:

1. The opening in the bone is shaped, at least at some points, in such a manner that the margins are bevelled at the expense of the internal table.

2. Two or more fine bone nails, rendered thoroughly aseptic, can be driven into the margins of the opening.

The bone-plates should correspond in thickness to the margins of the opening. If implantation of decalcified bone after operations on the skull does not entirely prevent the inconveniences incident to defective repair of the cranial defect, it can be relied upon as a measure which is well calculated to favor the reparative process, and to secure for the cranial defect which remains after the process of ossification has ceased, a firm, thick, and unyielding protective cicatrix, far superior to the cicatrix which forms where no re-implantation of bone or implantation of decalcified bone is resorted to.

II. Implantation of Antiseptic Decalcified Bone in the Treatment of Bone Cavities.

The following experiments were made for the purpose of studying the process of healing in antiseptic bone cavities after implantation of decalcified bone. In making the cavities the compact layer was removed with a chisel, and the spongy tissue and medulla with a sharp spoon. With a view to eliminate the function of the periosteum as an osteo-

genetic agent at the site of the operation, this structure was excised over an area corresponding in extent to the circumference of the cavity. The decalcified bone was cut in pieces to fit the cavity, and the wound in the soft parts was closed completely. In suturing the wound, catgut was used for the deep tissues and silk for the skin. The antiseptic dressing was retained in place with a plaster-of-Paris dressing.

Exp. 11.—Old dog; weight twenty-nine and three-quarters pounds. Operation February 23, 1888. A gutter was chiselled in the left tibia over its anterior upper aspect one and one-seventh inches long, one-fourth of an inch wide, its depth including the entire medullary cavity. The cavity was dusted with iodoform, and a piece of decalcified bone implanted in such a manner that the entire cavity was plugged. Primary union of wound. Dog killed thirty-five days after operation. Skin not adherent to subjacent bone. Site of operation marked by a slight depression on the surface of the bone. Centre of cavity filled with a firm cicatricial mass, into which spurs of bone are seen to project from each side and the floor, leaving a central line about one-thirtieth of an inch in width occupied by tissue which has not yet undergone ossification. Examination of this specimen shows that ossification commenced from the osseous walls of the cavity and progressed toward the centre of the implanted bone, and would have eventually resulted in the production of a sufficient quantity of new bone to fill the entire cavity. The process of ossification in this case was slow, probably on account of the advanced age of the animal.

Exp. 12.—Dog; weight twenty-one pounds. Operation the same as in the preceding experiment. Animal killed fifty-seven days after operation. At site of operation the tibia presents a symmetrical spindle-shaped enlargement corresponding in length to the length of the cavity. Margin of cavity somewhat raised by the formation of new bone. Cavity much diminished in size by the formation of new bone from its surfaces, the centre occupied by connective tissue undergoing ossification. Process of repair further advanced in the upper than the lower portion of the cavity.

Exp. 13.—Young dog; weight twenty-nine and three-quarters pounds. Implantation of a decalcified piece of bone two inches long, and one-third of an inch wide into a cavity made in the upper end of the left tibia, parallel to the axis of the bone. Animal killed eighty-two days after operation. Bone at point of operation considerably enlarged in all directions, imparting to it the appearance of a fracture repaired with little or no displacement. Cavity almost completely filled with new bone, leaving only in the centre a few points which had not so far undergone ossification. Surface of new bone somewhat rough and on same level with the margins of the cavity. This specimen furnishes a beautiful illustration of the existence of plastic periostitis and osteomyelitis starting from the seat of trauma and involving the entire thickness of the bone.

Exp. 14.—Young dog; weight seventeen and one-half pounds. Operation the same, only that by accident the knee-joint was opened. Animal killed seventy-two days after operation. Bone at site of operation not enlarged, only that the margins of the cavity present a ridge of dense bone. The entire cavity filled with compact bone, which on its surface is rough and firmly adherent to the soft tissues. A longitudinal section of the bone through the centre of the cavity shows that the new bone is exceedingly dense, and that partial restoration of the medullary cavity has taken place. The injury of the knee-joint resulted in bony anchylosis between the articular surfaces of the tibia and femur. These experiments demonstrate that it requires a long time to fill with new bone a cavity two inches long and five-sixteenths of an inch wide, the average time being approximately from seventy-five to ninety days. The length of time is greatly modified by the age of the animal, as ossification of the granulation tissue progresses much more rapidly in young than in old animals. Ossification takes place first

in the oldest granulations starting from the bone surfaces and advances toward the centre of the cavity in the shape of spurs or projections, so that in a cavity where ossification has not been completed after removal of the soft tissues, the new bone presents a rough and uneven surface. In the specimen from the last experiment the compact tissue in the medullary cavity has become osteoporotic and medullary tissue has become deposited in spaces over an area indicating the extent of the new medullary canal.

III. Clinical Observations on Implantation of Antiseptic Decalcified Bone.

Case I. *Circumscribed central osteomyelitis of head of tibia.*—A man, thirty-five years of age, German, by profession a teacher, was admitted into the Milwaukee Hospital, October 26, 1887. No history of syphilis. Received a glancing gunshot injury of the tibia during the Turko-Servian war. The bone was not fractured, and the wound healed in the course of a few weeks. Since then he has been in excellent health, and the injured leg caused him no inconvenience until six weeks before his entrance into the hospital. At that time, without any apparent cause, he was attacked with a deep-seated pain at the site of the previous injury. The pain became so excruciating that the patient, finding no relief from the usual treatment, repeatedly threatened to commit suicide. Examination revealed a scar at the junction of the epiphysis with the shaft of the tibia over the anterior surface. No swelling of soft parts and no enlargement of the bone, but a circumscribed spot exceedingly tender to pressure indicated the seat of pain. The diagnosis of circumscribed deep-seated suppurative inflammation was made.

The leg was shaved and thoroughly disinfected and the operation performed without an anæsthetic, as the patient refused to take either ether or chloroform. Esmarch's constrictor was applied to the thigh and the bone exposed by a straight incision. The periosteum at this point was found slightly thickened and abnormally vascular. The tibia was opened with a small round chisel and an abscess cavity the size of a hazelnut disclosed near its centre. The cancellated tissue around the abscess was osteoporotic and infiltrated with pus, which required the removal of more bone with the chisel and sharp spoon, until the cavity in the bone measured one-fourth of an inch in length and one-sixth of an inch in width, when healthy tissue was reached. The cavity was thoroughly irrigated with a strong solution of sublimate, well dried and dusted with iodoform, when it was firmly packed with iodoformized decalcified bone chips. A catgut drain was introduced into the lower angle of the wound, the periosteum sutured with catgut and the skin with silk. A copious antiseptic, absorbent dressing, composed of iodoformized gauze and a cushion of sublimated moss applied and the elastic constrictor removed. The limb was placed upon a posterior splint and was kept in an elevated position. The pain was promptly relieved.

First dressing at the end of a week, when the wound was found completely healed with the exception of a few granulations at the point of drainage. The patient left the hospital four weeks later, when, by an examination of the bone, it would have been difficult to locate the site of operation. The cicatrix was movable and not adherent to the subjacent bone. There has been no return of any symptoms since the operation.

It is hardly probable that in this case the osteomyelitis was caused by pus microbes which might have remained in the tissues since he sustained the injury. As the injury to the bone was superficial and the abscess was centrally located, it is more reasonable to assume that the injury created a *locus minoris resistentiæ*, and that the tissues thus predisposed became infected by floating microbes from the circulating blood. The customary treatment for such a lesion consists in operative measures, which are intended simply to secure an outlet for the products of inflammation, while the successful treatment of the cavity with decalcified bone depends on securing perfect asepticity of the cavity, which in this instance required the removal of a considerable area of infected tissue beyond the limits of the abscess.

Case II. *Recurring suppurative osteomyelitis of head of tibia.*—Female, aged twenty-seven years; nurse in Milwaukee Hospital. Twelve years ago suffered from an attack of acute osteomyelitis about the junction of the upper with the middle portion of the tibia. A number of pieces of bone escaped at different times during a period of two years, when, finally, without operative interference, an apparent cure followed. Since then she has enjoyed good health until a few weeks ago, when she experienced a severe pain in the knee on the side of the previous attack of osteomyelitis. The knee-joint became swollen and tender. The temperature was always above normal toward evening. Rest in bed and applications of ice were of no avail in removing the swelling or mitigating the pain. Suspecting the existence of a central osteomyelitic focus in the head of the tibia, I regarded the gonitis as a secondary affection, and made a careful search for evidences of a primary affection of the bone. A circumscribed tender point to the inner side of the tubercle of the tibia was found. This place was taken as a guide, and, under strict antiseptic precautions, an opening was made toward the centre of the head of the tibia, and an abscess cavity about the size of a hickory-nut was found, centrally located, at a point between the epiphyseal line and the articular cartilage. The spongy tissue around this abscess was infiltrated, and almost the entire interior of the head of the bone had to be removed with the sharp spoon and chisel. A very thin layer of bone and the articular cartilage separated the joint from the cavity. The cavity was fully as large as a medium-sized orange. After thorough disinfection and iodoformization, this enormous space was packed with decalcified bone chips, each layer being freely dusted with iodoform. Deep and superficial sutures and capillary drainage with strings of catgut.

Primary healing of wound. The pain and swelling of knee-joint subsided completely after the operation. The patient left the hospital a few weeks after the operation. A slight superficial suppuration followed a partial reopening of the wound. The progress of repair in the interior of the bone progressed uninterruptedly, and in about three months' time definitive healing had taken place. The contour of the upper portion of the tibia has been completely preserved, and the bone at the site of operation presents a smooth and even surface. The skin is not adherent to the new bone. The functions of the knee-joint are unimpaired, and the patient has since then performed the arduous duties of a nurse without suffering the slightest pain or inconvenience.

In this case the secondary osteomyelitis was a manifestation of continuation of the primary cause, some of the pus microbes having remained in a latent condition on the proximal side of the primary seat of infection, and had again become pathogenic upon the accession of an exciting local cause or causes. As no retraction of the skin at the point of operation has taken place more than a year after the operation, it must be assumed that the entire cavity has become filled with new bone.

CASE III. *Plastic osteomyelitis of the lower end of the tibia following fracture of the fibula.*—A man, twenty-eight years old, was admitted into the Milwaukee Hospital, April 18, 1888. General health good. No hereditary predisposition. Five years ago he sustained a fracture of the fibula with severe sprain of ankle-joint. After a slow recovery from this injury he was able to walk about until two years later, when a fixed pain appeared in the lower end of the tibia, which gradually increased in severity for several months, followed by swelling and marked tenderness just above the internal malleolus. When examined the lower portion of the tibia was found uniformly enlarged, and a localized point of tenderness was detected over the inner surface of the bone just above the epiphyseal line. At this point an opening was made into the tibia, after carefully reflecting the periosteum, one-third of an inch in length and one-fourth of an inch in width, and extending its depth beyond the centre of the bone. The bone was harder than in a state of health, consequently I explored the surrounding tissue with a drill from the cavity, but failed in detecting evidences of suppuration. The cavity was filled with one large piece of decalcified bone. Wound closed by buried and superficial sutures. The pain ceased immediately after the operation and has never returned since. The wound was completely healed in two weeks. The limb was kept at rest for a number of weeks for the purpose of favoring the process of repair in the interior of the bone. The cavity has become filled with new bone, and the surface of the tibia at the site of operation presents a smooth and even surface. The osteomyelitis in this case was of the plastic variety, and hence the operation was done entirely in aseptic tissue, and it was not deemed necessary to resort to disinfection of the cavity or to iodoformization of the bone chips. The pain was evidently due entirely to tension, and was promptly relieved by the operation.

CASE IV. *Secondary central suppurative osteomyelitis of head of tibia.*—A female, thirty years old, was admitted into the Milwaukee Hospital June 5, 1888. Eight years ago I made an extensive operation for necrosis of the central and lower portion of the tibia which had followed an attack of osteomyelitis when she was a child. A number of sequestra were removed and suppurating cavities laid open. After a number of months the wound finally closed, leaving quite a defect in the bone at the site of operation with the cicatrix firmly adherent to the bone. She remained well until two months ago, when, without any apparent cause, she was attacked with a severe pain in the upper portion of the same bone. The suffering increased in intensity from day to day until the pain became so severe that opiates failed to procure relief. No swelling of the bone or soft parts could be detected, but over the anterior surface of the head of the tibia in close proximity to the knee-joint a well-defined circumscribed area of tenderness could be mapped out. The

entire limb was thoroughly disinfected and while the limb was elevated Esmarch's constrictor was applied around the thigh.

A straight incision was made parallel to the limb through the centre of the tender surface down to the bone. The periosteum was found slightly thickened and could be easily separated from the underlying bone. The bone itself was exceedingly vascular and not as dense as in a condition of health. With an ordinary drill the bone was explored in a central direction. At the depth of about one-fifth of an inch resistance ceased, and upon withdrawal of the instrument a few drops of pus escaped. The bone was now chiselled in the direction of the perforation, and near the centre of the head of the tibia on a level with the epiphyseal line an abscess cavity the size of a small walnut was disclosed. The abscess was surrounded by a zone of osteoporotic bone the meshes of which contained granulation tissue and pus. All of the tissues which presented macroscopical evidences of disease were removed with the chisel and sharp spoon. After this was done the cavity was as large as a hen's egg and in very close proximity to the knee-joint. A number of punctures were made with the sharp point of Paquelin's cautery in different directions from the cavity, for the double purpose of destroying pus microbes which might have remained and to initiate a plastic osteomyelitis. The cavity was thoroughly irrigated with a 1 : 2000 solution of sublimate, and after drying it it was freely dusted with iodoform. It was then packed with decalcified bone chips cut the size of a thumb-nail and thickness of blotting-paper. In making the implantation layer after layer was covered with a thin film of iodoform. The periosteum was sutured with catgut and the skin with silk, leaving only a small opening in the lower angle of the wound for capillary drainage, which was made with a catgut string tied in a bundle. The operation had the effect of relieving the pain at once.

The limb was kept as usual for the first few weeks in a slightly elevated position upon a posterior splint. At the end of the first week the dressing was removed and the wound was found in an aseptic condition. At the end of the second week superficial sutures removed, wound completely healed, except a small granulating surface where the catgut drain had been inserted. At the end of six weeks patient could walk and the head of the tibia presented a normal contour, its anterior surface being perfectly smooth and skin not adherent to bone. A minute linear cicatrix was the only thing which remained as a visible reminder of the recent extensive operation.

This case is one of many of secondary osteomyelitis of the head of the tibia that I have seen following years after a primary attack of acute suppurative inflammation of the shaft and lower extremity of the bone. The etiological relation between the primary and the secondary attack appears to be a direct one, the cause of the first attack, the pus microbes, remaining in the tissues in a latent condition in the direction of the venous and lymphatic circulation, until at a later date by some accidental cause or causes, a *locus minoris resistentiæ* is created. My own experience has taught me that the secondary attacks, as a rule, are not as intense as the first, the lesion appearing in a more circumscribed form and attended by less febrile disturbance.

CASE V. *Secondary chronic osteomyelitis of upper epiphysis and shaft of tibia.*—Male, aged thirty, admitted into the Milwaukee Hospital June 19, 1888. Family history good. Twenty-seven years ago suffered from an acute attack of osteomyelitis of tibia. Seven years ago I removed, by quite an extensive operation, a number of sequestra from the lower third of this bone. The middle third at that time was much enlarged, but as the patient experienced no pain and no sinuses were present nothing was done to this part of the bone. After many months the wound healed by granulation, leaving quite a depression over the lower anterior surface of the bone. He remained well until a year ago, when the pain recurred in the upper and middle portion of the bone, which was soon followed by the formation of several fistulous openings. On examination now, the whole shaft of the tibia and the upper epiphysis were found enormously enlarged and through the fistulous openings a probe could be introduced into the interior of the bone without detecting necrotic bone. I decided to perform Neuber's implantation of skin flaps. The operation was rendered bloodless by Esmarch's constrictor. About one-third of the entire thickness of the shaft of the tibia had to be chiselled away before it was found possible to cover the bone with the sutured skin flaps. The outer portion of the bone was as hard as ivory, while the interior of it was traversed by numerous sinuses lined with granulation tissue and containing here and there small fragments of dead bone. The head of the tibia had to be excavated almost completely before healthy tissue was reached. It contained an abscess cavity the size of a pigeon's egg. As it was found impossible to line this large cavity with a skin flap, it was packed with chips of decalcified bone.

The whole operation was performed under strict antiseptic precautions, and the extensive wound was dressed with iodoform gauze and sublimated moss, and limb confined upon a posterior splint was kept in an elevated position. On the third day the dressing was removed, as it had become saturated with bloody serum. The margins of the skin flaps had become gangrenous and suppuration had commenced. The cavity in the head of the bone also suppurated and the bone chips had to be removed. It required several months before the wound was completely healed, the longest time being required to line the cavity in the head of the bone with a healthy cicatrix.

In this case the implantation of decalcified bone chips failed because the cavity was not rendered completely aseptic by the operation. The elastic constriction produced a very disagreeable effect, inasmuch as it caused complete paralysis of sensation and it required several weeks before sensation returned.

CASE VI. *Acute osteomyelitis of lower end of the femur.*—Boy, seven years of age, was admitted into the Milwaukee Hospital June 5, 1888. Three years ago, when the child was in good health, osteomyelitis developed after a contusion of the thigh. An abscess formed and was opened by incision over the outer and middle aspect of the thigh. A few weeks later another opening had to be made over the internal condyle of the femur. The upper incision healed while the lower has continued to discharge pus. The lower posterior aspect of the femur was exposed by an incision in the line of the fistulous opening. An opening at the point of bifurcation of the linea aspera was found in the bone which led into

a cavity lined with granulations and containing a small sequestrum. The cavity was freely laid open with the chisel and the granulations were thoroughly removed with Volkmann's spoon. After thorough disinfection the cavity was iodoformized and packed with decalcified bone chips. The granulations lining the tract in the soft parts were also removed, and the deep tissues united with catgut sutures and the skin with silk. Capillary drainage with several strands of catgut. Wound and limb dressed in the usual manner. Wound healed under two dressings. Later a connective tissue abscess retarded the progress of the case, but did not interfere with the process of repair in the cavity. In the course of two months recovery was complete with perfect restoration of the bone defect.

CASE VII. *Suppurative osteomyelitis after compound fracture of tibia.*—The patient, a female, aged sixty-five years, was admitted into the Milwaukee Hospital, September 26, 1888. She was anæmic and considerably emaciated. Eighteen months ago she sustained a compound fracture of the left leg. The fracture of the tibia was about four inches above the ankle-joint, and the upper fragment had perforated the skin. The wound suppurated, but the fracture united after the usual time. A fistulous opening communicating with the interior of the bone has remained. The patient is unable to use the limb, as she suffers from pain in the lower end of the tibia, which is greatly aggravated by attempts to walk. Some œdema about the ankle and foot. Lower end of tibia slightly enlarged and painful on pressure. The bone was exposed by a straight incision, and after reflecting the periosteum with the attached soft parts the bone was found very vascular and softened. Taking the fistulous opening as a guide, the compact layer was removed over the entire length of the cavity with the chisel. The cancellated tissue in the interior of the bone was found infiltrated with pus and permeated by granulation tissue. After removal of all diseased tissue with a sharp spoon, the cavity in the bone measured one inch in length and one-fifth of an inch in width. After thorough cleansing and disinfection with a 1 : 2000 solution of sublimate, it was dried and dusted with iodoform, after which it was packed with bone chips. Over this gutter the periosteum was stitched with catgut sutures and the external wound with silk, leaving only a small space for the insertion of a catgut drain. Pain ceased after operation. No rise in temperature. External wound healed by primary union. Six weeks after operation the patient left the hospital with the entire cavity apparently filled with bone.

The purulent infection of the bone in this case did not lead to sequestration, but to osteoporosis and the formation of an abundance of granulation tissue. The infection extended from the seat of fracture downward to the lower epiphyseal line. The walls of the cavity were composed of a thin shell of compact tissue.

CASE VIII. *Acute suppurative osteomyelitis and necrosis of upper portion of tibia.*—Male, twenty-three years of age, was admitted into the Milwaukee Hospital, January 7, 1889. Had an acute attack of osteomyelitis of the upper portion of the tibia three years ago, which led to the formation of an abscess which was opened on the tenth day. This opening never closed. A number of small pieces of dead bone have

escaped. General health good. The upper portion of the tibia is very much enlarged, and a fistulous opening situated on the inner surface of the tibia about one-fifth of an inch below the tubercle leads into the interior of the bone. After chiselling away the compact layer anteriorly in the line of the opening, it was found that the disease had taken its starting-point at the epiphyseal line and had extended upward to near the articular cartilage and downward obliquely from the inner to the outer side of the bone to a distance of one and one-fifth inches. The upper terminus of the inflammatory process was an infiltration of the cancellated tissue with pus, necessitating an excavation of a cavity the size of a walnut. The exposure of the sinus in the bone made it necessary to chisel a gutter in an oblique direction from within outward and downward one-third of an inch in width and one and one-fifth inches in length. A number of small sequestra were removed and the granulations scraped out with a sharp spoon. Disinfection and packing of the cavity with decalcified bone chips in the usual manner. Catgut drain and deep and superficial sutures. As the dressings were saturated the next day they were removed. Suppuration followed the third dressing, with the result that four weeks after the operation some of the bone chips, showing the corroding action of the granulations, escaped. At this time some of the bone chips could be seen in the cavity embedded in granulation tissue.

The subsequent course demonstrated that the chips which were in close contact with the walls of the cavity were retained while the central portion of the packing was eliminated. When suppuration ceased the cavity had nearly closed, and the gutter was filled two-thirds of its depth with vigorous granulations; after another thorough disinfection the remaining cavity was again implanted with bone chips, and in the course of another four weeks the entire surface has healed, leaving only a very slight depression on the surface of the bone.

The clinical history of this case shows that the cavity was aseptic from the beginning, and that the reparative process had progressed in a satisfactory manner for two weeks, when accidental infection occurred at the time the third dressing was made, which for a time arrested the healing process and resulted in the elimination of the central portion of the bone packing. As soon as suppuration had ceased and an aseptic condition of the granulating surfaces could be secured, secondary implantation was done and was followed by complete success.

Case IX. *Resection of knee-joint; large tuberculous cavity in head of tibia.*—Female, aged twenty years, was treated at the Milwaukee Hospital for tuberculous arthritis of knee-joint during the year 1888. The disease had existed for several years, and, in spite of the usual treatment, continued to grow worse. The knee-joint was greatly distended by what appeared to be masses of granulation tissue. As the head of the tibia presented two well-marked points of tenderness, it was surmised that the disease had taken its starting-point in this bone, and that the knee-joint had become involved secondarily. Typical resection of knee-joint. The section made through the tibia revealed three small tuberculous cavities. Condyles of femur healthy. A careful inspection of the sawed surface of the tibia revealed at one place osteoporotic bone, and exploration at this point disclosed another deep-seated tuberculous focus,

the removal of which resulted in the formation of a cavity the size of a walnut. This cavity was packed with bone chips before the resected surfaces were brought in apposition. Complete healing under two dressings. Firm bony union in the course of two months. Good use of limb and no relapse to date. That the filling of the cavity with decalcified bone chips expedited bony consolidation, there can be no doubt, as with the removal of the implanted chips the osteoporotic material invaded the cavity and approached the resected surface of the femur, furnishing a considerable portion of the intermediary callus.

CASE X. *Chronic circumscribed suppurative epiphyseal osteomyelitis of tibia.*—Male, aged eighteen years, was admitted into the Milwaukee Hospital March 13, 1887. For the last three years the patient has suffered at times from a severe pain just above the ankle-joint. At different times he has been treated for sprain of the ankle or rheumatism. During the last few weeks the pain has become so severe that he was unable to walk, and had to take opiates to procure sleep. No history of tuberculosis or syphilis. At a point corresponding to the lower epiphyseal line of the tibia some swelling and increased local temperature. About the centre of the swelling great tenderness on pressure. On making an incision down to the bone through the centre of the swollen part the periosteum was found very much thickened. On removing the compact tissue with the chisel an abscess cavity the size of a hazelnut was found in the centre of the bone, immediately above the epiphyseal line. As the bone around the cavity showed evidences of disease it was scraped out with a sharp spoon until the cavity was as large as a walnut. Disinfection and iodoformization of cavity followed by implantation with decalcified bone chips. Double row of sutures and capillary drainage with catgut. External wound healed under first dressing. Later some suppuration in connective tissue about the wound, which, however, did not affect the healing process in the cavity, which was completed at the end of six weeks.

IV. GENERAL DIRECTIONS FOR TREATMENT OF BONE DEFECTS BY IMPLANTATION OF ANTISEPTIC DECALCIFIED BONE.

1. *Decalcification and disinfection of bone.* A fresh tibia of an ox is the best material for decalcification. The bone is cut in sections two inches in length, and, after carefully removing the medullary tissue, is kept in dilute muriatic acid, the fluid being changed every few days until the process of decalcification has been completed. After this has been accomplished the bone can be readily cut into pieces about one millimetre in thickness, making the sections parallel to the long axis of the bone. The acid is then removed by washing and by keeping the bone immersed in a weak solution of caustic potash. The bone is then rendered antiseptic by keeping it until it is needed in a solution of sublimate in alcohol 1 : 500 in a wide-mouthed bottle, which is kept hermetically sealed by a glass stopper to prevent evaporation of the solution. When the bone is needed, it is taken from the bottle and placed in a five per cent. solution of carbolic acid, or a weak solution of sublimate. In making the plates or disks for filling a cranial

defect the bone is cut so as to correspond in thickness to the bone removed, and accurately to fit into the opening. A number of small perforations in the disk or plate should always be made, as through these openings the space underneath the bone is kept drained; at the same time the early entrance of granulation tissue into these openings effects fixation of the bone *in situ* and favors the early removal of the implanted substance by substitution with permanent living tissue. Before implantation both sides of the plate should be dusted with iodoform. For packing bone cavities the decalcified bone should be cut in thin slices or chips, which should be laid upon a compress of aseptic gauze, so as to remove the surface moisture, when they are dusted with iodoform before they are implanted into the cavity. Aseptic decalcified bone drains, in the absence of more suitable material, can be used in packing bone cavities.

2. *Asepsis at the seat of implantation.* The most essential condition for success in the treatment of bone defects by implantation of decalcified bone is a perfectly aseptic condition of the tissues to be brought in contact with the implanted bone. This condition is easily procured in operations on bones for lesions other than those caused by infection with pus microbes, such as tumors, parasites, and tuberculous and syphilitic affections uncomplicated by suppuration. In the surgical treatment of these affections after the removal of the diseased tissue the seat of operation must be aseptic if the ordinary precautions in the prevention of infection from without have been observed. In such cases speedy healing of the external wound and the early partial or complete reproduction of the lost bone are assured.

The next most favorable cases for this procedure are circumscribed osteomyelitic processes in the epiphyseal extremities of the long bones as we observe them in cases of primary circumscribed epiphyseal osteomyelitis, or in the form of a recurring attack in the same place, perhaps years after a diffuse osteomyelitis of the entire shaft. Under such circumstances the inflammatory focus can be located externally by the presence of a circumscribed area of tenderness, and the tender spot constitutes the guide in the search for the abscess. The seat of inflammation is freely exposed with a chisel and the walls of the abscess cavity are scraped out with a sharp spoon until healthy tissue is reached all around. The precaution should be taken to wash out the cavity with an antiseptic solution before attacking the abscess wall so as to prevent the contamination of the healthy tissue with the products of the infection by the mechanical diffusion of the pus microbes. For the final disinfection of such a cavity a strong solution of sublimate is used, and after thoroughly drying its walls it is dusted with iodoform. Iodoformization of the cavity and the implantation of antiseptic bone chips are measures which are well calculated to resist the pathogenic action of

pus microbes which might still remain, and in the majority of cases will secure an aseptic healing of the wound.

This method of treating bone cavities is also applicable after operations for necrosis resulting from a previous attack of acute suppurative osteomyelitis. With a view to obtain an aseptic condition of the cavity it is necessary that the line of demarcation between dead and living tissue should have formed, the involucrum must be well developed and the soft parts in a healthy condition. The operation which precedes the implantation must accomplish more than the simple extraction of the necrosed bone, it implies the removal of all infected tissue lining the interior of the involucrum and the fistulous tracts in the soft tissues. The involucrum must be laid open with the chisel sufficiently to expose to sight and direct treatment its entire interior for the purpose of removing with the sharp spoon all of the infected granulations, at the same time the fistulous tracts in the soft tissues must be made accessible to the same treatment. After the thorough mechanical removal of all infected tissues the wound surfaces must be irrigated freely with a hot solution of sublimate, and for final disinfection a twelve per cent. solution of chloride of zinc may be applied with a brush, after which the cavity is flushed again, dried, and iodoformized. In operations for acute diffuse osteomyelitis all known surgical resources are inadequate in rendering the field of operation aseptic, and hence contraindicate the subsequent treatment by implantation with decalcified bone.

3. *Necessity of performing the operation by bloodless method.* I have previously made the statement that in the implantation of a disk or plate of bone into a defect in the skull the hemorrhage from the brain and its coverings should be carefully arrested before the implantation is made, as otherwise compression of the brain might arise from accumulation of blood underneath the implanted bone. The disk or plate may be relied upon in arresting hemorrhage from the vessels in the bone which by other measures it is sometimes found difficult to control. In the treatment of bone cavities in regions where it is possible to render the operation bloodless by elastic constriction, this should always be resorted to, as it prevents unnecessary loss of blood during the operation and enables the surgeon to resort to means and measures for procuring an aseptic condition, which otherwise it would be impossible to apply with the same degree of thoroughness and efficiency. Unless special indications present themselves the elastic constriction is continued until after the dressing has been applied.

4. *Implantation.* In the treatment of a bone cavity by implantation with decalcified bone, the chips are poured into the cavity and are packed quite firmly until the surface of the cavity is reached. The bone chips act as an antiseptic tampon which arrests the free oozing from the surface of the bone which always takes place after the removal

of the constrictor. Some blood escapes between the bone chips and coagulates at once, thus forming a desirable and useful cement substance, which permeates the entire packing and temporarily glues, as it were, the chips together and the entire mass to the surrounding tissues.

5. *Treatment of external wound.* The periosteum should be carefully preserved in exposing the bone and, after the implantation, is sutured over the surface of the bone chips with catgut sutures. If the bone is deeply located, it may become necessary to apply another row of buried sutures in bringing into accurate apposition other soft parts. The skin is finally sutured with silk. It is of great importance to secure accurate apposition of the divided soft parts in order to preserve for the subjacent bone all of its natural coverings.

6. *Drainage.* In some instances it would be undoubtedly superfluous to secure any form of drainage, as when the cavity is perfectly aseptic and hemorrhage is not in excess of requirements, healing of the entire wound would be accomplished under one dressing. Experience, however, has taught me that tension arising from extravasation of blood often exerts an injurious influence upon the process of healing and should be carefully avoided. As it is desirable to heal as much of the wound as possible without interfering with drainage I have invariably introduced an absorbable capillary drain in the lower angle of the wound. A string of catgut twisted into a small cord answers an admirable purpose.

7. *Dressing of wound.* The wound is covered with a strip of aseptic silk over which a few layers of iodoform gauze are applied. Over this a cushion of sublimated moss is placed with a thick layer of salicylated cotton along its margins for the purpose of guarding more securely against the entrance of unfiltered air; the whole of it is retained by a circular bandage of gauze evenly and smoothly applied. For the purpose of securing absolute rest for the limb it is placed upon a posterior splint and kept in a slightly elevated position. If no indications arise, the first dressing is not removed for two weeks, when the entire wound will usually be found healed, except a few granulations at the place where the catgut drain was inserted. A smaller antiseptic compress is applied and the limb dressed in a similar manner. It is advisable to enforce rest not only till the external wound has healed, but until the whole process of repair has been completed, which embraces a period varying from four weeks to three months, according to the size of the cavity and the age of the patient.

8. *Secondary implantation.* If an operation is followed by suppuration the result of imperfect antisepsis tubular drainage must be established and the same treatment pursued as in suppurating wounds. If suppuration takes place soon after the operation and is profuse, it is probable that all of the bone chips will be lost. If it develops after

granulation tissue has had time to form and the purulent discharge is moderate in quantity, the prospects are that the bone will remain and serve its purpose as a nidus for the granulation tissue. In such cases an antiseptic irrigation should be made every three or four days until suppuration has ceased. If the bone chips are lost by suppuration or have to be removed for the purpose of a more thorough disinfection of the cavity, no attempt should be made at re-implantation until suppuration has been arrested, or, in other words, until the cavity has become lined with granulations, and is in a comparatively aseptic condition, when the time for secondary implantation has arrived. After the cavity has been irrigated with a strong antiseptic solution it is dusted with iodoform and the granulations are scarified in a number of places for the purpose of obtaining a sufficient amount of blood to fill the spaces between the bone chips, which are implanted in the same manner as in the treatment of a recent cavity. Complete closure of the external wound under these circumstances is seldom obtainable and the surface of the exposed portion of the cavity should be provided with a thin layer of Schede's moist blood-clot. The antiseptic properties of the material used in packing the cavity exerts a potent influence in maintaining asepticity after secondary implantation.

Conclusions.

1. Antiseptic decalcified bone is the best substitute for living bone grafts in the restoration of a loss of substance in bone.

2. In the treatment of bone cavities, antiseptic decalcified bone is preferable to Schede's blood-clot, as it is not only a perfectly aseptic, but at the same time, also a strongly antiseptic substance.

3. Implantation of a disk or plate of antiseptic decalcified bone into a cranial defect may be relied upon as a hæmostatic measure in arresting bleeding from the vessels of the diploë, it constitutes a good temporary substitute for the lost portion of the cranium, it prevents the direct union of the brain or its envelopes with the pericranium, and, finally, it furnishes the most favorable condition for the production of new bone from the margins and the closure of the remaining defect by a firm and unyielding membrane.

4. The packing of an aseptic bone cavity with chips of antiseptic decalcified bone guards against unnecessary loss of blood and exerts a potent influence in the prevention of infection by pus microbes that might have remained upon the surface of the wound or in the tissues.

5. Capillary drainage by an absorbable drain should be established after implantation for the purpose of preventing the accumulation of more blood in the wound than is necessary to form a temporary cement

substance between the bone chips and between the contents of the cavity and the surrounding tissues.

6. In the treatment of an aseptic bone cavity by implantation of chips of antiseptic decalcified bone, the packing answers the purpose of an antiseptic tampon and furnishes the best medium for the growth and development of the tissue resulting from the regenerative process initiated by the trauma.

7. Secondary implantation can be successfully practised in the treatment of a suppurating bone cavity after suppuration has ceased, and the cavity can be transformed into the same favorable conditions for healing as an aseptic wound.

THE VALUE OF CREOLIN, HYDRONAPHTHOL, AND SODIUM FLUOSILICATE AS GERMICIDES.[1]

By Charles J. Foote, M.D.,
of New Haven, Conn.

Sodium fluosilicate and hydronaphthol are often used as germicides, but their germicidal properties, so far as I can learn, have never been demonstrated. They have both been shown to be efficient antiseptics.

The germicidal and antiseptic properties of creolin have been tested by Esmarch, Eisenberg, and others. It has been demonstrated to be a germicide of nearly equal power with carbolic acid.

The following experiments were undertaken to determine the germicidal power of sodium fluosilicate, hydronaphthol, and creolin as compared with one another and as compared with some of the older germicides which they tend to supplant, such as the bichloride, carbolic acid, and thymol.

Method.—The bacteria used to test the germicidal power were the bacillus typhosus, the pneumococcus (Friedländer's), the streptococcus erysipelatis (Fehleisen), the staphylococcus pyogenes aureus, and those of decomposing beef bouillon which had been previously sterilized and then exposed to the air of the laboratory for two weeks. Pure cultures were then made in sterile beef bouillon of the B. typhosus, streptococcus erysipelatis, and pneumococcus.

The staphylococcus pyogenes aureus does not grow readily in beef bouillon, therefore a pure culture of this was made in nutrient gelatine which had been steamed so long that it remained liquid. In this the staphylococcus grows abundantly.

[1] The experiments given in this paper were performed in the bacteriological laboratory of the Yale Medical School.

Solutions were then made of the following germicides:

Bichloride, 1 to 10, 000.
Bichloride, 1 to 2000.
Carbolic acid, 2 per cent.
Creolin, 2 per cent.
Creolin, 1 to 1000.
Hydronaphthol, saturated aqueous solntion (1 to 1150).
Sodium fluosilicate, saturated aqueous solution (1 to 120).
Sodium fluosilicate, 1 to 1000.
Thymol, saturated aqueous solution (1 to 1200).
Resorcin, 2 per cent.

One cubic centimetre of one of the antiseptics was placed in a sterilized test-tube with a sterilized pipette, and one cubic centimetre of one of the cultures was lowered with a sterilized pipette into the test-tube and allowed to flow into the antiseptic. Care was taken in introducing and withdrawing the pipette not to touch the sides of the test-tube. The tube was then plugged with sterilized cotton, and at the end of one-half hour and two hours, inoculations were made from it into tubes of sterilized beef bouillon, except in the case of the staphylococcus pyogenes aureus, when the inoculations were made into the fluid nutrient gelatine.

The inoculations were made by means of a long platinum needle, the end of which had been twisted into a spiral. With this a good-sized drop could be taken out of the culture which had been mixed with the germicide, and transferred to a test-tube of sterile beef bouillon.

The transfer, if properly manipulated, need take but a few seconds, and the cotton plugs are immediately replaced in the tubes. If the tubes are held well inclined toward a horizontal line, there is little danger of contamination from the air during manipulation. In fact, the danger of infection from any source other than the culture mixture is very slight. I have proved this by going through the same manipulation and inoculating sterile fluids into sterile bouillon. I have done this over fifty times and have never had one of the tubes of sterile bouillon break down.

The tubes of sterile beef bouillon which had been inoculated from the culture mixtures were then placed in an incubator and kept at a temperature of 40° C. (104° F.), and watch kept for the first signs of cloudiness, which indicates the growth of bacteria.

Since an equal part of the fluid culture was added to the solution of each antiseptic, this was diluted one-half and consequently the strength of each of the antiseptics tested was just one-half the strength of the original solution.

Two different strengths of sodium fluosilicate and creolin solutions were used, that the limits of their germicidal power might be roughly determined in case the stronger solution proved to be a germicide. A 1 to 2000 solution of the bichloride was used as a check, since if any

tubes inoculated from mixtures of this broke down there would be a probability of some error in the method.

The fact that tubes inoculated from mixtures of this always remained sterile proved the absence of infection from without.

CONCLUSIONS.—Below is a table of the results obtained after an exposure of one-half hour and of two hours.

		Sodium fluosilicate, 1 to 2000.	Sodium fluosilicate, 1 to 240.	Thymol, 1 to 240.	Hydronaphthol, 1 to 2300.	Creolin, 1 to 2000.	Creolin, 1 per cent.	Bichloride, 1 to 20,000.	Bichloride, 1 to 4000.	Resorcin, 1 per cent.	Carbolic acid, 1 per cent.
Staphylococcus pyogenes aureus	½ hr.	Cloudy	Cloudy	Sterile	Cloudy	Cloudy	Sterile	Sterile	Sterile	Cloudy	Sterile
	2 hrs.	"	"	"	"	"	"	"	"	"	"
Pneumococcus	½ hr.	Cloudy	Cloudy	Sterile	Cloudy	Cloudy	Cloudy	Sterile	Sterile	Cloudy	Sterile
	2 hrs.	"	"	"	"	"	"	"	"	"	"
Streptococcus erysipelatis	½ hr.	Cloudy	Cloudy	Sterile	Cloudy	Cloudy	Sterile	Sterile	Sterile	Cloudy	Sterile
	2 hrs.	"	"	"	Sterile	"	"	"	"	"	"
Bacillus typhosus	½ hr.	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	Sterile	Sterile	Sterile	Cloudy	Sterile
	2 hrs.	"	"	Sterile	"	"	"	"	"	"	"
Beef bouillon	½ hr.	Cloudy	Cloudy	Sterile	Sterile	Cloudy	Sterile	Sterile	Sterile	Cloudy	Sterile
	2 hrs.	"	"	"	"	"	"	"	"	"	"

It will be observed that the only two germicides invariably sterilizing each culture are the two solutions of the bichloride (1 to 20,000 and 1 to 4000), and the solution of carbolic acid (1 per cent). It will further be observed that tubes inoculated from mixtures of sodium fluosilicate (1 to 2000 and 1 to 240), of resorcin (1 per cent.), and of creolin (1 to 2000) invariably broke down; consequently we may dismiss sodium fluosilicate, resorcin, and creolin (1 to 2000) from our consideration, with the conclusion that they are of little value as germicides.

The remaining ones to consider are creolin (one per cent.), thymol, and hydronaphthol; and of these thymol evidently ranks first, only one tube in ten breaking down. Creolin (one per cent.) ranks next, and appears to be a good germicide in a one per cent. solution, but not quite strong enough in this solution to destroy the pneumococcus, although efficient against the other bacteria used.

Hydronaphthol in a 1 to 2300 solution possesses a little germicidal power, three tubes out of ten remaining sterile.

Placing these antiseptics in the order of their germicidal powers in the strength of the solutions tested, we have:

(1) Bichloride, 1 to 20,000.
(2) Carbolic acid, 1 per cent.
(3) Thymol, 1 to 240.

(4) Creolin, 1 per cent.
(5) Hydronaphthol, 1 to 2300.
(6) Sodium fluosilicate, 1 to 240.
Resorcin, 1 per cent.
Creolin, 1 to 2000.

Uses.—Antiseptics are of value where long action is required to prevent the growth of bacteria while repair goes on in the tissues; they are, therefore, useful substances with which to impregnate surgical dressings. Germicides are useful where rapid action is demanded, and where the fluid remains in contact with the infected area for a short time only; they are therefore useful for irrigating wounds, for sprays, for douches, for washing the hands, and for the sterilization of instruments.

The term germicide implies sterilization, while the term antiseptic implies sepsis with retardation or absence of development.

An antiseptic, unless also a germicide, can be of no value, except as so much water, for washing a surgeon's hands or instruments, or for irrigating or douching.

This distinction needs to be observed, since many antiseptics, such as sodium fluosilicate and hydronaphthol, are used for douching, irrigating, washing hands and instruments, when sterilized water would be just as efficient and even more so, since antiseptic solutions may not themselves be sterile and consequently may convey infection.

Creolin, according to my experiments, ranks far above sodium fluosilicate and hydronaphthol. Though insoluble in water, it forms an emulsion with it which possesses all the antiseptic and germicidal properties of a solution. My experiments show it to have very nearly equal germicidal properties with carbolic acid, comparing equal per cent. solutions; but its toxic properties have been shown to be considerably less, and therefore its available germicidal strength is greater than that of carbolic acid.

Creolin has been used for sterilizing instruments, but there are certain objections to its use for this purpose. Being an opaque fluid, instruments put in it are found with difficulty during an operation; the same characteristic is an objection to its use for irrigating during operations, in that it obscures the parts operated upon. It also renders the handles of instruments slippery, as if they had been dipped in oil.

As carbolic acid can be used as strong as five per cent. for sterilizing instruments, it would seem to be the best germicide for this purpose, since it furnishes a clear solution which is a powerful germicide and does not injure surgical instruments.

Perhaps the best uses to which creolin can be put are for washing the hands and for vaginal douches. A five per cent. solution of creolin does not benumb the hands as carbolic acid does, and does not crack and

roughen them as the bichloride does, but renders the skin smooth and supple.

The great value of vaginal and intra-uterine douches of the bichloride in the prophylaxis and treatment of puerperal septicæmia is undoubted. The mortality from puerperal septicæmia since their introduction has decreased from 5 per cent. to 0.34 per cent. There is, however, considerable danger of mercurial poisoning from their continued use. Stieffeck has reported cases of poisoning from douches of solutions of 1 to 3000 and 1 to 4000.

Virchow has reported a case of mercurial poisoning terminating in death, due to three intra-uterine douches, each containing one quart of a solution of 1 to 1000 of the bichloride, one douche being given each day for three successive days. The use of the bichloride douche in nephritis is always contraindicated.

Although the stronger solutions of the bichloride (1 to 1000 or 4000) are unsafe for continued intra-uterine douching, it would seem that a solution of 1 to 20,000 would be safe and efficient, especially if tartaric acid is added to the solution. A quart of this used in a douche would contain a little less than a grain of the bichloride, and since it would be held in solution by the tartaric acid, it would mostly flow away and not be precipitated on the endometrium.

Carbolic acid is often substituted for the bichloride for the intra-uterine douche, but it cannot be used stronger than three per cent., and even this for continued use would be unsafe.

A three per cent. solution of creolin thus far has proved a safe and efficient germicide for this purpose and a five per cent. solution can probably be used with safety. Creolin has the additional advantages of possessing hæmostatic properties and limiting secretions.

Creolin has been used in certain diseases of the eye and ear with success, but in solutions too weak to have any germicidal effect.

In conclusion, my investigations tend to show that for ordinary surgical use we have not in aqueous solutions of sodium fluosilicate and hydronaphthol germicides approaching in power weak solutions of the bichloride or one per cent. solutions of carbolic acid; that creolin possesses germicidal properties nearly equal to carbolic acid, and that it may properly be substituted for it for washing the hands and for intra-uterine and vaginal douches.

POLIOENCEPHALITIS SUPERIOR (NUCLEAR OPHTHALMOPLEGIA) AND POLIOMYELITIS.[1]

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It is a rare experience in neurological matters to have the pathology of a disease unravelled as quickly as was done in the case of those clinical groups of symptoms which we know as ophthalmoplegia externa and interna.

The paralysis of the muscular apparatus of the eye was soon discovered to be due, in most cases, to a lesion or lesions affecting the nuclei of the nerves which govern the various ocular muscles. In this nuclear paralysis, the nuclei of the oculo-motor nerves play a most important *rôle*, though the nuclei of the fourth and sixth nerves are involved frequently enough. Our knowledge of the pathological processes resulting in such lesions was gained by showing first of all that all the cranial nerve nuclei were subject to the same acute and chronic affections, and that what we ordinarily call progressive bulbar paralysis was, as far as its pathological character is concerned, exactly the same as the progressive paralysis affecting the ocular nuclei.

The relation of the bulbar process to poliomyelitis was firmly proved by cases of bulbar paralysis which were associated with symptoms resembling those of a progressive muscular atrophy or a chronic anterior poliomyelitis, and furthermore by cases of typical progressive muscular atrophy which, in their terminal stages, developed bulbar symptoms.

On the strength of this clinical analogy, Hutchinson, Mauthner, and Birdsall were struck with the pathological resemblances between the diseases affecting the ocular and spinal nuclei; and Wernicke proposed to call the affection of the oculo-motor nuclei a polioencephalitis superior, whence it followed that the bulbar paralysis might well be styled polioencephalitis inferior. While the analogy with poliomyelitis had been proven beyond the shadow of doubt for the bulbar cases, Wernicke's theory needed further proof as regards the cases of total ophthalmoplegia externa and interna. Heretofore but one case has been recorded (by Seeligmüller) in which the symptoms of a chronic poliomyelitis were associated with those of polioencephalitis superior, and with the exception of the cases of Henoch and Buzzard[2] in which an ocular (nuclear) paralysis occurred in the course of an acute

[1] Read before the American Neurological Association, June, 1889.
[2] Quoted by E. Blanc, Arch. gén. de Méd., Janv. 1887.

poliomyelitis anterior, I know of no cases which exhibit this interesting association of symptoms. The case which I report here proves rather conclusively that the same pathological process may give rise to a typical polioencephalitis superior and to chronic or subacute poliomyelitis anterior.

The history of this case is as follows:

H. M., æt. forty, is a man of robust build, unusually intelligent, and one who has experienced all the vicissitudes of life. He was born in this city, and has been married fourteen years. Has one brother living and healthy, and one brother who died from want of water, as the patient says, on the desert of Arizona. Both parents are dead; the father died of yellow fever in New Orleans in 1858; the mother died of a paralysis which lasted seven or eight years and began by turning-in of both feet. The paralysis of the legs became complete; she died at the age of seventy-four. The patient went to school at Syracuse, N. Y. As a boy had frequent "bilious" attacks associated with headaches and vomiting, was otherwise in robust health. He attended school until the age of twelve; went to New Mexico at the age of fourteen, and there learned a trade.

When sixteen years of age, one day after reading several hours got up to stretch himself, but fell back unconscious against a hot stove, burning the left temple severely—the scar is visible at the present day. He was insensible for several hours and was then put to bed; knew nothing of what had happened until he saw doctors around; no paralysis followed. A second similar attack, again after reading, occurred three months later, from which he quickly recovered. A third attack occurred, but the date of this he cannot recall. No further sickness until the age of twenty, when he was in Peru and was steward on a United States steamer. While on shore he fell from a horse, striking the right elbow and injuring the arm. Recovered completely from this fall.

At the age of twenty-five was in Europe; felt one day a severe pain in the left eye; engaged passage at once for New York, reaching there a few weeks later. By that time the left eye was closed. Went to sea again (to Australia on a sailing vessel), and during this trip noticed that the right lid was also beginning to droop. He was treated in Melbourne by electricity, but the condition remained stationary for several months. After that a slight improvement is said to have set in in the left eye, but the right eye grew worse; both pupils were dilated (physician's statement). Had double vision all the time, and small ulcers formed on the left eye. The Australian physicians suspected tumor of the brain. He had severe headaches at the time; the left eye became inflamed and was in such a bad condition that the physician advised enucleation, but the patient objected. After a short trip at sea, the inflammatory condition was at an end.

It was about this time that he began to be suspicious of his legs, for one day while walking on the deck his right knee gave way. A few days later the same accident occurred. Nevertheless he joined a ship from Australia to California. When thirty days out, he had to refuse duty as steward, as he could not move his right thigh, leg, or toe a single inch. The captain ordered hot steam bath, and gave him blue pill and black draught. He went to Oregon next—now thirteen years ago. He

remembers that when there he could not hold water nor contain feces. His left leg was not affected at any time. Iodide treatment was proposed; patient objected on the ground that he had never had any syphilitic affection. In consequence of the paralysis of the right leg he was compelled to go about on crutches. The doctor who examined him found a sensitive point between the shoulder-blades and ordered blisters, and strychnine internally. In six months time he was able to walk with the assistance of a stick; he could use the hip and knee joint, but could not move ankle or toes. The eyes remained in about the same condition; he was not worried by them. He undertook contract work on a railroad in Panama, and there contracted severe malaria.

One year and a half ago he was stricken down with prolonged fever. As soon as he recovered from this he travelled about considerably; finally went to Jacksonville, where he got a thorough drenching, which was followed by severe chill. One day he tried to read the papers but could not see anything. Last year, on his return to New York he was examined by Dr. E. Grüning, who performed an iridectomy of the right eye which did not improve vision. Later on, Dr. Grüning raised the left eyelid by operation and restored vision to that eye. Went to Panama in May, 1888, and returned to New York about seven weeks ago.

For the past four weeks he has been an inmate of the Montefiore Home for Chronic Invalids, where I have had the opportunity of studying the case. He denies ever having had gonorrhœa or syphilis, and an examination of his body reveals no symptoms of the latter. Has been moderate in sexual matters and has never been a hard drinker. Has smoked innumerable cigarettes for years. No loss of consciousness has occurred since the attacks recorded above. Does not suffer from headaches and but for the condition of his eyes and of his right leg would feel entirely well.

Present condition.—Strong, well-built man; heart sounds normal; no enlargement of liver, slight enlargement of spleen; other thoracic and abdominal organs normal. The most striking feature of the patient's appearance is the double ptosis, at present more marked on the right than on the left, in consequence of the operation on the left eyelid. Slight lateral nystagmus of right eye; in this eye also maculæ corneæ, old iritis with exclusion of pupil, small coloboma upward. Right pupil is not visible, left pupil dilated. A transparent, thin membrane has grown upward, covering nearly one-half of left pupil. The results of my examination of the eyes, which were kindly corroborated by Dr. E. Fridenberg, are as follows:

O. D.—Paretic—rectus internus, rectus externus, and inferior oblique. Paralyzed—levator palpebrarum, rectus superior, obliquus superior, and rectus inferior. Associated movements with the left eye do not differ from those attempted singly.

O. S.—Paretic—rectus externus, rectus internus, and superior oblique. Paralyzed—levator palpebrarum, rectus superior, rectus inferior, and obliquus inferior. Paralysis of iris (light reflex abolished), ciliary muscle normal. Accommodation reflex good. Media apparently clear in both eyes. Vision, left eye, $\frac{20}{c}$. Right eye $= 0$.

Ophthalmoscopic examination.—Left papilla normal; right papilla cannot be examined.

No change in the facial distribution. Hearing normal on right side; on left side somewhat diminished, but normal bone conduction. Tongue

protruded straight, slight fibrillary movements. Sensation of face and tongue normal in every particular. Smell and taste normal on both sides. The left arm appears to be slightly larger than the right, but grasp is equally strong on both sides. Sensation normal to touch and pain. Distinguishes numbers written on arm with greatest ease. No reflexes to be obtained in upper extremities. No difficulty in respiratory or abdominal muscles.

FIG. 1.

Subject attempting to look to extreme right.

FIG. 2.

Showing atrophy of right leg.

Lower extremities.—Marked atrophy of right leg from hip downward. Largest circumference on right side; hip, 14¼ inches; left side, 19½ inches; right calf, 10 inches; left calf, 12½ inches. Patient can flex knee very little, but cannot move toes of the right foot. Walks by exclusive use of posterior thigh and leg muscles. Muscular excitability lost in right thigh. No disturbance in sensation except apparent diminution of pain sense on inner aspect of right thigh. The left thigh and leg muscles show normal myotatic excitability and absolutely normal sensation. No change to be noted in any respect in leg of left side. There is no ataxia of either leg and none in the upper extremities. No Romberg symptom. The knee-jerks are lost on both sides and cannot be elicited by Jendrássik's method. All cutaneous reflexes sluggish but present.

The electrical examination reveals no changes in any of the muscles of the face, of the upper extremities, or of the trunk, nor in the left leg, but marked degeneration reaction exists in the anterior thigh and leg muscles. The vasti and anterior tibial muscles are atrophied to such an extreme degree that no reaction could be obtained with currents at command.

This history can be summarized in a few words: A man in perfect health, without any specific alcoholic or hereditary taint, is affected with

a slowly developing paresis or paralysis of all of the ocular muscles. This condition is scarcely fully established before a weakness of the right leg is noticed by giving way of the knee. This weakness is developed into a most marked paralysis associated with extreme atrophy. The symptoms remain restricted to the right leg, become retrogressive, and have not to this day affected the opposite leg. The arms remain entirely normal. The transitory bladder and rectal symptoms were probably due to an extension of the inflammation of the gray matter, and do not imply, to my mind, the existence of a transverse myelitis, acute, subacute, or chronic. No other interpretation can be put upon these symptoms except to say that in the course of a chronic nuclear paralysis of the eyes a subacute poliomyelitis set in. Both in the eyes and in the leg the disease developed in the same fashion and has practically remained stationary for years.

It will hardly be necessary in this paper to prove the diagnosis of subacute poliomyelitis in this case, and considering the rarity of poliomyelitis in the adult it would be strange indeed if the occurrence of such an affection in the course of a polioencephalitis superior were a mere coincidence. It seems to me to prove positively that the ganglion cells of the anterior horns of the spinal cord are subject to the same pathological changes as the large nuclear cells on the floor of the third and fourth ventricles.

In the case which Seeligmüller described, the upper and lower extremities were the parts first to be affected, and secondarily an affection of the eye, right and left oculo-motor nerves, set in. In this case there would seem to be a spreading by contiguity; and yet the third, fourth, and sixth nuclei were affected before the seventh, tenth, eleventh, and twelfth nuclei. The absence of such contiguity in my case does not argue, I think, against the supposition that the leg and eye symptoms are dependent on the same pathological process. It is a peculiarity of this morbid process that it is selective, that in some cases it affects parts contiguous with one another, but that again in other cases it does not spread in this manner. In some instances the upper extremities are affected and with these the ocular muscles, showing that the bulbar nuclei have not been similarly affected. The bulbar nuclei and oculomotor nuclei may be affected without an involvement of the sixth and seventh nuclei, and among the various cell groups constituting the oculo-motor nuclei we find that the pathological process may attack portions of the nuclei which are situated at the extreme anterior and posterior limits of the nucleus and skip cell groups lying in between. This is in close keeping with the pathological condition we meet with in cases of poliomyelitis anterior, for we see too many of these cases not to know that contiguous muscles often escape paralysis and atrophy, simply

because their representative ganglion cells in the spinal cord have not been affected like their immediate neighbors.

The involvement of the iris in the one eye (the condition of the other could not be examined) takes my case out of the category of cases of ophthalmoplegia externa. According to most authors, an ophthalmoplegia externa, with paralysis of the iris, would compel one to refer the lesion to the base of the brain, but since Westphal and Spitzka have plausibly shown that the nuclei for the accommodation and light reflex lie anteriorly and away from the remaining oculo-motor nuclei, it is readily seen that these nuclei also, one or both, may be affected by the extension of the inflammatory process. It is in this way that I explain the affection of the iris in this case. Since the accommodation reflex remained normal, it is natural to infer that the ciliary and iris nuclei must be some appreciable distance apart. We must be careful, however, not to be too positive in such assertions, for Thomsen has recorded cases in which there were distinct paralyses of various ocular muscles with only the slightest involvement of a few of the nuclear cells, and, strangest of all, one case of paralysis of associated vision upward due to a gummatous infiltration of the *oculo-motor root fibres*, whereas the nuclei were found entirely normal. It is for this reason also that I believe that the determination of the exact location of the various subdivisions of the oculo-motor nucleus on clinical grounds only,[1] has been carried too far. This question can be settled in no other way but by the experimental method, or by noting to what extent clinical and post-mortem records tally.

One other point in the case demands explanation: the knee-jerk is absent on both sides. The first suspicion was that of an accompanying tabes dorsalis, as in Westphal's well-known case; but this supposition must be abandoned, since a close examination with this end in view has shown the absence of every other important symptom of tabes. The absent reflex on the left side must therefore be regarded as the only evidence of the extension of the process in the spinal cord to the left half of the cord, but at the same time the normal condition of the muscles, the normal electrical reactions, and the total absence of atrophy prove that that side can be affected but very little.

The chief value of my case is, that it proves the close relationship between the gray matter at the floor of the third and fourth ventricles and the anterior gray horns of the spinal cord.

Wernicke choose the term polioencephalitis superior wisely enough; but Strümpell's polioencephalitis, a supposed cortical disease, has caused some confusion. Strümpell's theory and disease lack proof, and for the

[1] Starr, Journal of Nervous and Mental Diseases, May, 1888.

present we need not decide whether we shall have to add a polioencephalitis suprema to polioencephalitis superior.

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A COMPARATIVE REPORT OF THE STATISTICS OF AMPUTATION, DURING AND PRIOR TO ASEPTICISM.

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IT has been my endeavor, in the following paper, to present a fair synopsis of the results obtained in amputation, both prior to and during the *aseptic period*—the latter condition being a state of affairs brought about by the antiseptic methods in vogue at the present day—and to show by actual comparison the improvement the change has wrought in the mortality resulting from this operation.

The cases herein tabulated are all compiled from the reports of the London Hospitals, unless otherwise stated, as it has been found impossible to obtain enough material from similar American institutions to make a comparison of the old and new methods of much scientific value, owing to the general late adoption of the antiseptic treatment by the hospital authorities here.

The mortality after operation has been gradually diminishing since the art of surgery has become a science. This has been due not only to the improvements in operative surgery in general, but also to the use of anæsthetics; the perfection of the railway system, which permits an early inspection of the patient by the surgeon; and, finally, the accommodations offered to such cases in the numerous hospitals scattered over the land, where, with careful nursing by trained nurses, and the constant presence of the house-surgeon, dangers can be readily met and guarded against which formerly proved fatal for want of these facilities.

Nothing has caused such a wonderful decrease in the mortality resulting from this operation, however, as *asepticism*, brought about by the present modified Listerian method of antiseptic treatment of all wounds. If it were possible to get absolute cleanliness, we could get along without

antiseptic appliances;[1] but as this is not possible, certain means must be adopted to prevent contamination and infection in wounds.

What these means are, the reader is, no doubt, fully familiar with, and as it is not my purpose to discuss them here, I will proceed with the various tables by means of which I hope to show conclusively the truth of what is favorably asserted for the antiseptic treatment of all wounds:

TABLE I.—SHOWING THE COMPARATIVE MORTALITY OF MAJOR AMPUTATIONS, IN REFERENCE TO CAUSE AND PERIOD OF OPERATION, BOTH BEFORE AND DURING THE TIME OF ASEPTICISM.

Cause and Period.	Pre-aseptic Period.			Aseptic Period.			Mortality per cent. in favor of asepticism over and above pre-aseptic period.
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	
Primary[2] . .	2540	901	35.47	470	114	24.26	11.21
Secondary[3] . .	777	390	50.19	180	62	34.44	15.75
Disease[4] . . .	2602	618	23.75	1227	197	16.06	7.69
Grand total . .	5919	1909	32.25	1877	373	19.87	12.38

In the above table several facts are shown:

(*a*) That the mortality of amputations done under *aseptic precautions* is reduced as much as 15.75 per cent. in the highest instance, and in the lowest case 7.69 per cent.; the percentage in favor of the antiseptic method in the aggregate of cases being 12.38. Surely a saving of life worthy to commend in the highest terms the means used in attaining it.

It may be claimed by some, that as the above results are procured by a comparison of cases operated upon in different hospitals, under different surroundings—hygienic and otherwise—that they are not conclusive enough. Table III. is prepared so as to overcome that objection.

TABLE II.—SHOWING THE COMPARATIVE MORTALITY OF MAJOR AMPUTATIONS FOR INJURIES AND FOR DISEASE.

	Pre-aseptic Period.			Aseptic Period.			Mortality per cent. in favor of asepticism over and above pre-aseptic period.
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	
Injury . . .	3317	1291	38.92	650	176	27.08	11.84
Disease . . .	2602	618	23.75	1227	197	16.06	7.69

[1] Thomas G. Morton, M.D.: Clinical Lectures delivered at the Pennsylvania Hospital, October 2 and 23, 1886. Reprinted from the Philadelphia Medical Times.

[2] Amputated within twenty-four hours subsequent to accident.

[3] Amputated after the primary period.

[4] Amputated for either deformity or disease. The primary and secondary amputations were done for injuries.

(*b*) That the mortality in amputation for disease is less than that for injury.[1] (Shown to better advantage by Table II.)

(*c*) That primary amputations are more successful than those done later; in the *pre-aseptic period* the death-rate being nearly one in three in the early operations, while that of the late operations was about one in two. In the *aseptic period* the death-rate is less than one in four in the early operations, and more than one in three in the late or secondary operations.

TABLE III.—SHOWING THE COMPARATIVE MORTALITY OF AMPUTATIONS, BOTH BEFORE AND DURING THE ASEPTIC PERIOD, IN THE SAME HOSPITALS.

Hospital.	Pre-aseptic Period.			Aseptic Period.			Mortality per cent. in favor of asepticism over and above pre-aseptic period.
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	
S. B. H.[2] . .	358	74	20.67	629	108	17.17	3.50
G. H.[3] . . .	735	253	34.42	783	186	23.75	10.67
S. T. H.[4]. . .	181	61	33.70	465	79	16.99	16.71
Grand total	1274	388	30.46	1877	373	19.87	10.59

In this table the lowest reduction in favor of the antiseptic treatment is 3.50 per cent.; the highest is 16.71 per cent. What could be more satisfactory?

It is hardly possible for one to disprove the conclusions deduced from this table of facts.

Listerism, as it was, is not the modern method of antiseptic surgery. Some of its early advocates carried the matter to the extreme, we readily admit, but now that the truth has been learned, and aseptic surgery has stood the test of time and experience, the surgeon who does not carry out his treatment accordingly is hardly giving his patients that security against infection, disease, and even death, which modern science has shown it to lessen in a great measure in all operations.

In Table IV., in which the mortality per cent. is shown in an even more favorable light than in the tables previously quoted, notice particularly the saving of life in amputations done upon the leg and forearm.

The fact that the gravity of amputation increases as the trunk is approached—as was called attention to by Dr. John Ashhurst, Jr.[5]—is shown in the following table. Dr. D. Hayes Agnew[6] gives a comparative

[1] Ashhurst: Int. Encyclopædia of Surgery, vol. i. (revised edition) p. 632.
[2] St. Bartholomew's Hospital. [3] Guy's Hospital. [4] St. Thomas's Hospital.
[5] Principles and Practice of Surgery, 4th ed., p. 112.
[6] Agnew's Surgery, 1881, vol. ii. p. 331.

table of the major amputations in American, London, and Paris hospitals, which is also interesting as showing the same relative condition in all three places. The aggregate mortality of amputations in America is recorded therein as 28.81 per cent., and in Paris as 56.54 per cent.

TABLE IV.—SHOWING THE MORTALITY OF AMPUTATIONS IN THE DIFFERENT PARTS OF THE BODY, BOTH BEFORE AND DURING THE ASEPTIC PERIOD.

	Pre-aseptic Period.			Aseptic Period.			Mortality per cent. in favor of asepticism over and above pre-aseptic period.
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	
Forearm . . .	113	15	13.28	172	5	2.91	10.37
Arm	173	53	30.63	220	46	20.91	9.72
Leg	345	136	39.42	698	108	15.47	23.95
Thigh	535	224	41.87	787	214	27.19	14 68
Total . .	1166	428	36.71	1877	373	19.87	16.84

It appears, then, from this table, that in the *pre-aseptic period* the mortality of amputations of the *forearm* was about one in eight, that of the *arm* over one in three, of the *leg* not quite one in three, and in the *thigh* about two in five; and that in the *aseptic period* it was less than one in thirty-five in the *forearm*, less than one in five in the *arm*, less than one in seven in the *leg*, and about one in four in the *thigh*.

It is known that the danger of amputation increases with the age of the individual operated upon—a point brought out in the investigations of Dr. George W. Norris.[1] It will be well, then, to compare pre-aseptic statistics of amputation, arranged according to age, with the statistics of the same institutions during the present aseptic period.

TABLE V.—SHOWING THE RESULTS OF PRE-ASEPTIC AMPUTATIONS AT GUY'S AND ST. BARTHOLOMEW'S HOSPITALS, ACCORDING TO AGE.

Age.	Guy's Hospital.[2]				St. Bartholomew's Hospital.[3]			
	Recovered	Died	Total.	Mortality per cent	Recovered	Died.	Total.	Mortality per cent.
19 and under .	121	33	154	21.4	58	3	61	4.9
From 20 to 40 .	145	78	223	34.9	72	20	92	21 7
40 and over . .	95	87	182	47.8	44	30	74	40.1
Total . .	361	198	559	35.4	174	53	227	23.3

[1] AMERICAN JOURNAL OF THE MEDICAL SCIENCES, August, 1888.

[2] Analyzed by Mr. Golding-Bird, Guy's Hospital Reports, third series, vol. xxi. p. 253.

[3] Ashhurst: Encyclopædia of Surgery, vol. i. (revised ed.) p. 626.

TABLE VI.—SHOWING THE RESULTS OF ASEPTIC AMPUTATIONS AT GUY'S AND ST. BARTHOLOMEW'S HOSPITALS, ACCORDING TO AGE.[1]

Age.	Guy's Hospital.				St. Bartholomew's Hospital.			
	Recovered	Died.	Total.	Mortality per cent.	Recovered	Died.	Total.	Mortality per cent.
19 and under .	264	54	318	16.9	143	11	154	7.2[2]
From 20 to 40 .	180	44	224	19.7	256	11	267	4.1
40 and over . .	153	88	241	36.5	198	76	274	27.9
Total . .	597	186	783	23.8	597	98	695	14.1

TABLE VII.—SHOWING THE DIMINUTION OF MORTALITY OF AMPUTATIONS, DURING THE ASEPTIC PERIOD, IN GUY'S AND ST. BARTHOLOMEW'S HOSPITALS, ACCORDING TO AGE.

Age.	Diminished mortality during aseptic period.
19 and under	2.9 per cent.
From 20 to 40	19.9 " "
40 and over	13.9 " "
Total	19.4 per cent.

The figures and tables herein given show fairly and truthfully, so far as statistics can, what has been the saving of life owing to the adoption of the aseptic or Listerian treatment of wounds. It may be possible that this is not the only method by which wounds may be successfully treated, but be that as it may, many operations are now undertaken that we dared not formerly perform, and with a far greater prospect of success than with any other known mode of treatment.

If Listerism has done nothing else, it has at least secured an amount of attention that was never paid before, to cleanliness; but it has done more, in that it has aimed at not mere prevention or removal of septic material, but at the destruction of it, by producing in the neighborhood of all wounds an aseptic atmosphere.

Previous to the adoption of aseptic or Listerian treatment of wounds, a mortality of 31.9 per cent. was recorded (Tables V. and VI.) in two of the main London hospitals. Subsequent to that time, under aseptic pre-

[1] Impossible to compile statistics from the annual reports of St. Thomas's Hospital for this table or Table I., hence their omission.

[2] Mortality was increased here owing to some of these cases being very young children, under five years of age.

cautions, the death-rate has been decreased (as shown in the same tables) to 12.5 per cent., a saving of life of nearly 20 per cent. Granting that these figures are faulty and misleading in conclusions drawn from them, may we not, by deducting 50 per cent. for such supposed errors in the present case, conclude that the remainder is a fair and just figure upon which to base an opinion as to the merits or demerits of the question of the value of antiseptic surgery. It certainly appears so, for what could be more reasonable? If then ten per cent. or even five per cent. of life is saved by the aseptic treatment of all amputations, its adoption should be universal, both in hospitals and private practice.

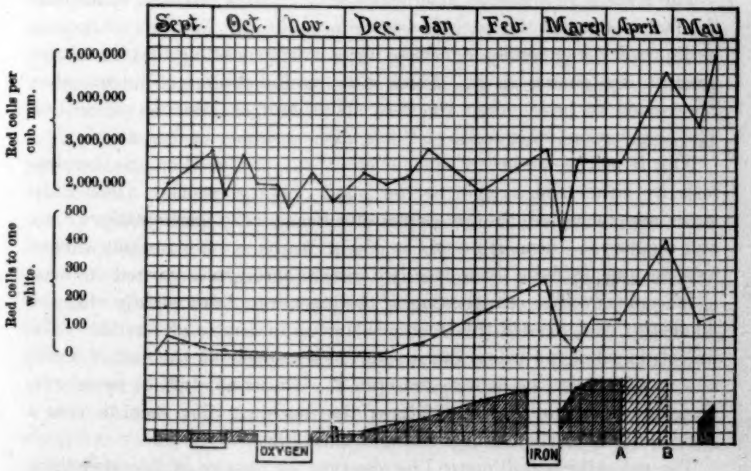
41 North Twelfth St.

NOTE ON THE TREATMENT OF LEUKÆMIA.

By J. K. Thacher, M.D.,
Professor of Physiology and Clinical Medicine in Yale University, New Haven.

F. O., male, present age thirty-four, first noticed that he was getting large about the waist in the winter of 1886–87; from that date he became feebler, was troubled with frequent and sometimes severe nose-bleed, exhausting night-sweats, cough, some fever, and marked dyspnœa. There has been no priapism.

I saw him in the early part of September, 1888. His waist measured between forty and forty-one inches. The spleen extended down about three inches beyond the middle line, very nearly reaching Poupart's ligament. It seemed to have sagged a little, so that the upper right border, as determined by percussion at the back, had moved a little further than



normal from the middle line. The spleen was hard, its border notched, and it was firmly fixed in position. The entire abdomen was hard, but no definite proof of ascites could be detected. There was well-marked œdema of the legs. The liver was not much enlarged. There were no signs of pulmonary tuberculosis.

The white blood-cells were to the red as one to twenty, and the red were 2,400,000 per cubic millimetre.

The variations of the blood-cells under treatment are exhibited in the chart; they ran in the earlier weeks of treatment as low as 1 to 10.

The upper line represents the absolute number of red cells per cubic millimetre.

The middle line gives the number of red cells for one white.

The lower line indicates the treatment. Above the base-line arsenic is represented, and one (vertical) space means five drops of Fowler's solution three times daily. There were a few unrepresented intermissions of arsenic for forty-eight hours, it being resumed at the last dose. The spaces below the line indicate drugs other than arsenic; they are in general unimportant—a little iron, strychnine, or oxide of zinc. For a period of about a month in October and November, however, he took oxygen. This was bought under the name of "pure oxygen for medical purposes," but was really found to be diluted with nitrogen so that the oxygen constituted only a trifle over two-thirds of the mixture. (The analysis was very kindly made for me by Prof. H. E. Smith, of the Medical Department of Yale University.) Of this oxygen mixture the patient took twenty-eight quarts once daily, with very fair but not absolute regularity. During the time marked "Iron," in February and March, the dose was simply 15 gtt. tr. ferri chlorid. t. i. d.

The more lightly shaded arsenic space in April is intended to indicate the fact that while the patient was ordered 30 gtt. Fowler's sol. t. i. d., he in reality was remiss in taking his medicine, stating that he felt the greatest repugnance to it. There were no indications of intoxication. He seemed to have taken the dose about half as often as prescribed. The observations were made at 8 P.M. after a supper at 6 P.M.

Now it will be observed that no effect was produced on the leucocytosis by either the oxygen or the small doses of arsenic. When the latter was increased the leucocyte line began very perceptibly to rise and reached the proportion of 1 to 350 in March. After a substitution of iron for arsenic for a little over two weeks there was a marked increase of leucocytes. The reinstitution of the arsenic in doses rapidly rising to 30 drops t. i. d. carried the leucocyte line up to a ratio of 1 to 530. The line dropped again when the arsenic was stopped at the end of April, and rose a third time on its resumption. The arsenic effects seem to be sluggish—*i. e.*, the rises and falls of the leucocyte line seem to come a little while after the changes in the arsenic line.

The red-cell-per-millimetre line observes the change of the other lines,

and, if anything, seems to respond to the arsenic a little more quickly than the leucocyte line.

The general condition of the patient at present is very good. His symptoms have throughout corresponded pretty well with the blood improvement. His girth is thirty-four or thirty-five inches in place of forty or forty-one. The lower right border of the spleen has retreated to the middle line, or a trifle to the left of it, below the umbilicus. The upper left border is above the costal border, but still further from the middle line than at first; so that the reduction in size of the spleen has been very considerable, involving, I should say, a shortening of its larger diameter four or five inches. It is now freely movable and the abdomen is soft. He has had no epistaxis of any extent since Christmas; he has no fever, no night-sweats, no dyspnœa or cough. His appetite is excellent; he looks and feels very well. His weight, notwithstanding the diminution of girth, has increased several pounds.

ON A CASE OF SIMPLE IDIOPATHIC MUSCULAR ATROPHY, INVOLVING THE FACE AND THE SCAPULO-HUMERAL MUSCLES.

By William Osler, M.D.,
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In the classification of primary myopathies, the difficulties have been greatly increased by the description of forms depending upon the situation of the atrophy. Varieties of the same disease have been described as separate maladies, and from the inevitable confusion we have scarcely escaped.

Erb has simplified matters very much by grouping all the forms under one designation—dystrophia muscularis progressiva—of which two chief types are recognized:

(1) With primary hypertrophy, the pseudo-hypertrophic muscular paralysis.

(2) With primary atrophy.

As cases of pseudo-hypertrophic paralysis occur in which atrophy and hypertrophy exist in the same muscle, or wasting occurs in one group and enlargement in another, or atrophy in one group precedes for months the development of hypertrophy in another, it is not surprising that these two forms are regarded by many as identical. Gowers, however, calls attention to the fact that, when cases of atrophy occur in families, they never present the features of pseudo-hypertrophic disease.

It is in the cases with primary muscular atrophy that the greatest confusion exists in classification, and the following forms have been recognized and described:

(1) Erb's juvenile form.

(2) The facio-scapulo-humeral form of Duchenne, and of Landouzy and Déjérine.

(3) The hereditary form of Leyden.

(4) The peroneal type of Charcot, Marie, and Tooth.

Gowers has, it seems to me, followed the sensible plan in disregarding all of these subdivisions, and describing the cases under the designation "simple idiopathic muscular atrophy."[1]

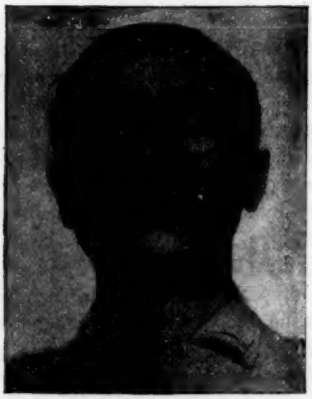
CASE.—Sebastian B., aged fifteen, sent to the University Hospital November, 1888. Good family history, both parents living; mother lame, cause unknown. Has one brother, aged twenty, and a second aged thirteen. Has three sisters, aged seventeen, eight, and three, respectively, all well. Two brothers are dead, cause unknown.

Personal history.—He has had measles, smallpox, and possibly scarlet fever. For several years he has had attacks of abdominal pain. He has also had earache. Until five years ago he was well and strong, and played about like other boys. From this time he had gradually been getting weak in the arms, and for between three and four years he has not been able to whistle. All of this time he has been in fair health, but has had increasing difficulty in dressing himself, and in getting from the recumbent to the erect posture.

Present condition.—Station erect, back not curved, gait normal.

Face smooth, immobile, and expressionless—the so-called facies myopathique; naso-labial fold absent; lips project, but the prominence is in

FIG. 1.



Appearance of face.

part owing to the teeth. The eyes are large, no exophthalmos; movement of the eyeballs normal. On attempting to close the eyes the pal-

[1] A full discussion of the relation of these forms to each other has recently been published by Dr. B. Sachs. New York Med. Journal, Dec. 15, 1888.

pebral slit remains open about two mm. in breadth. Most forcible contraction of the orbicular muscles fails completely to cover the eyes. (See Fig. 1.) He is unable to frown or to pucker his eyebrows. The forehead can be wrinkled. He has fair power of movement of lips, and he can pucker them in the movements to whistle, but cannot make the sound. When he laughs he opens the lips vertically, but the angles of the mouth are not drawn out. The zygomatics do not appear to act. The dilators of the nose move slightly on deep inspiration.

Neck. Thyroid is a little enlarged. The clavicular portion of the sterno-cleido muscle is wasted, the upper part is better marked than at the lower. The scaleni seem well developed,

Thorax. Long, and depressed in antero-lateral regions. The pectorals are extremely wasted, scarcely a portion of the muscle can be felt. The subclavicular regions are much flattened. The scapulæ are winged and stand out prominently. Trapezius is wasted in its lower portion. The superior fold on either side is still well marked. The neck does not look so thin from behind. The latissimi dorsi and serrati muscles are much wasted. The interscapular regions are flattened as if the rhomboids were involved. The supra- and infra-spinati are thin, and the scapular fossæ show with great distinctness.

The *upper extremities* are extremely wasted, contrasting strongly with the legs. The movements are considerably impaired. The right arm can be lifted above the head; the left only to the level of the ear. At the most prominent part of the biceps the circumference is only five inches. The bony prominences of the shoulder-joints stand out almost free from muscular covering. The acromion and coracoid processes and the greater and lesser tuberosities can be plainly seen. The deltoids are extremely wasted. When the arm is everted there is a small portion of the muscle, just above its insertion, which stands out with great prominence. The biceps, triceps, and brachialis anticus on both sides are much wasted. In making strong flexion of the arm there is still a slight belly on the biceps. At the outer margin of the upper part of the right biceps there is an oval, firm portion. Proportionally more muscle remains on the triceps. The forearm measures at the middle five and a quarter inches. The supinators have lost their prominence. The flexors remain in considerable bulk. There is a fair volume of muscle in the extensor surface. Pronation and supination are perfect. The hands are thin; no special wasting of the thenar or hypo-thenar eminences, or of the interosseus spaces. He cannot make a fist satisfactorily with either hand. Movements of the fingers are slow but perfect. There are little warts on the hands, several on the palmar surfaces and terminal phalanges.

Fig. 2 gives a fair representation of the distribution of the atrophy.

Lower extremities. The glutei do not appear wasted. The thighs at the middle measure eleven and a half inches. The region of the internal vasti seem somewhat wasted. The calves measure nine and a half inches. No wasting of the leg muscles. Moves the feet and toes perfectly.

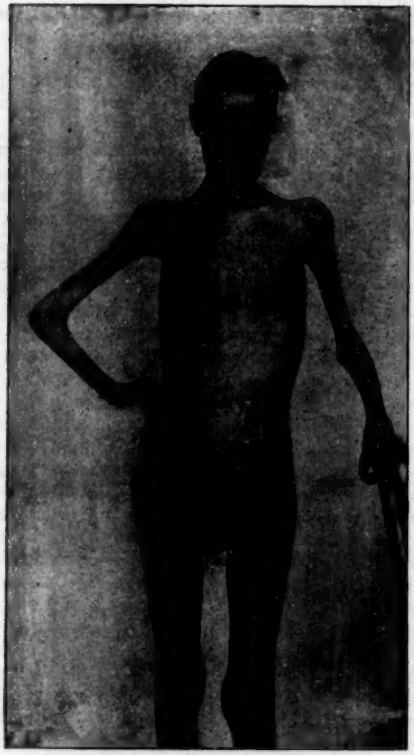
There are no fibrillary tremors. Sensation everywhere perfect. Knee-jerk extremely feeble.

Dr. Willets reported that there was no reaction of degeneration in any of the wasted muscles.

The patient can still dress himself, but with difficulty. When recum-

bent, he cannot raise himself upright. He gets out of bed by rolling the feet and legs out first, then turning on his face and sliding out.

Fig. 2.



Showing muscular atrophy.

Duchenne first described a form of muscular atrophy beginning in infancy and attacking the muscles of the face. Landouzy and Déjérine (*Revue de Médecine*, 1885) have studied this form with great care, and regard it as different from the other forms of juvenile hereditary myopathies. In their first communication they described two families, and reported a post-mortem which showed the spinal cord to be normal. In a second communication (*Revue de Médecine*, December, 1886) they described six cases, and again expressed doubts as to the identity of this with Erb's juvenile form, and also denied that it has any connection with pseudo-hypertrophic muscular paralysis. Marie and Guinon (*Revue de Médecine*, 1885) describe four cases in two families, in one instance beginning at the age of thirty. They hold that this form is

not essentially different from the other varieties of the primary myopathies. Remak (*Neurologisches Centralblatt*, 1884) describes the case of a man, aged thirty-two, in whom the affection began in childhood; there were other members of the family also affected. He, too, seems to regard it as a variety of the juvenile form of progressive muscular atrophy. Kreske (*Neurologisches Centralblatt*, 1886) reports the case of a boy of ten, affected since his fourth year. There were no other members of the family affected. Singer (*Zeitschrift für Heilkunde*, Bd. 8; *Neurologisches Centralblatt*, 1887) reports the case of a man, aged thirty-four, who for two years had difficulty in whistling; the muscles of the shoulder and of the face were also affected. He, also, regards this form as only a variety, not a separate affection. Spillman and Haushalter (*Revue de Médecine*, 1888), and Sperling (*Neurologisches Centralblatt*, 1889) also report cases.

Altogether, there are recorded about twenty-five of this variety of idiopathic muscular atrophy. In the great majority of cases, the disease has begun in childhood or in youth. One case of Landouzy and Déjérine began at the fortieth year in the shoulder and arm; four years later it affected the face. This, with the case of Singer's, which began at thirty-two years, and the case of Marie and Guinon, which began at thirty years, shows that the onset of the affection may be delayed until adult life. The cases all seem to conform to the characteristics of simple idiopathic muscular atrophy, and I see no reason why we should classify this variety as a separate disorder.

The cases of this kind, and of Erb's juvenile form, do not appear to be nearly so frequent in this country as the pseudo-hypertrophic variety, which is not at all an uncommon disease. With the exception of the case of James Stewart's report (*Canada Lancet*, September, 1884) no cases of Erb's juvenile form have been reported, and none, so far as I know, of the so-called Landouzy-Déjérine type.

A FATAL CASE OF VARICELLA GANGRÆNOSA.

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The following case of this rare modification of the varicellar lesion I have had the opportunity of observing in the practice of Dr. C. W. Büchler:

On November 18, 1888, E. A., female, aged four years, was attacked by varicella, a number of the vesicles became gangrenous, leading to the death of the child on November 27, 1888, with symptoms of septicæmia.

Early in November, a sister of the patient, aged seven years, and a brother of six, were attacked by varicella, which, with moderately high fever, ran a mild course, with the ordinary duration of the disease. On the 17th of November a third child became affected, and on the following day the case under consideration was first seen.

In this case the attack was ushered in by a temperature of 104°, and a pulse of 120. On the following day a crop of vesicles (without prior papulation) appeared upon the abdomen, chest, back, and extremities. While the majority of the efflorescences took the usual course of the varicellar vesicle, and then desiccated, about eighteen or twenty, especially some of those on the chest, back, and buttocks, were partially filled with pus of a greenish-yellow color, and presented a flaccid appearance. Each lesion was surrounded by a broad phlegmonous areola.

The vesicles, thus modified, soon assumed a gangrenous appearance, and on the fourth day of the eruption were converted into deep ulcers, covered by a blackish-green detritus, some attaining the size of a ten-cent piece, and others that of a quarter of a dollar. They were so offensive as not to be controlled by antiseptics, and so painful that anodyne dressings were without effect.

All of these ulcers were sharply defined, as if punched out, and penetrated the entire thickness of the cutis and subcutaneous tissue, exposing the fasciæ. The largest of them were located upon the abdomen and back; but one, especially large and deep, was situated over the mastoid process of the left side, close to the insertion of the cartilage of the ear, which became involved in the destructive process.

Notwithstanding active antipyresis, tonic treatment, and the most scrupulous antiseptic precautions, the temperature could not be reduced lower than 103°. The pulse became feeble and rapid, the thirst was unquenchable. During the last two days of the disease, a violent attack of diarrhœa with very offensive stools supervened, and on November 27th coma terminated the condition.

From the paucity of accounts, which, as far as I am aware, are confined solely to the British journals, one must infer that gangrenescence of the varicellar lesion is not frequently encountered. Huchinson,[1] I believe, was the first to direct attention to this condition. At a meeting of the Royal Medico-Chirurgical Society, October 25, 1881, he stated that for more than ten years he had recognized a gangrenous form of varicella, which was occasionally accompanied by a purulent iritis; in some instances the disease proved fatal, while in the majority of cases recovery, with deep scars in some and great damage to the eyes in others, resulted. In the worst cases the disease involved the entire thickness of the skin, and left an abrupt, punched-out ulcer. He also quoted from Whitely Stokes, of Dublin, who, in 1807, described an affection prevailing in Ireland under the designations "white blisters," the "eating hives," and the "burnt hole," which Hutchinson regarded as identical with the affection under consideration.

In proof that the affection is no other than a modified varicella, Hutch-

[1] Lancet, October 29, 1881, p. 751.

inson points to the fact of the simultaneous occurrence of ordinary varicella in other members of the same family. He also mentions having seen similar cases in the practice of Drs. Barlow and David Lees, and refers to wax casts in Guy's Hospital, labelled "rupia escharotica," which he unhesitatingly regarded as examples of gangrenous varicella. Concerning the etiology of the affection, Hutchinson claims that this modified lesion of varicella usually occurred in previously healthy children.

At the same meeting, Dr. Barlow[1] stated that he had notes of fifteen cases of varicella gangrænosa, which began with a vesicle, not a papule, without an areola; the vesicles collapsed, and a punched-out or trephined ulcer, as he calls it, ensued. The progress is so rapid that, in a day or two, the ulceration may extend through the entire thickness of the skin. In no instance were the children thus affected healthy; frequently there was lung disease, and in six post-mortem examinations tubercle was present.

Drewitt[2] also reported a case in which gangrenous patches appeared upon the inner surface of the thigh and on the labia; other children of the same family were simply affected by ordinary varicella.

In a fatal case reported by Abercrombie,[3] that of an ill-nourished male baby, aged fourteen months, there was found, on post-mortem examination, some pneumonia of both lungs, with recent pleuritis of the right side. There was also a small ulcer above the ileo-cæcal valve. Besides a number of smaller caseous mesenteric glands, one opposite the cæcum attained the size of a marble. Here also it is mentioned that a remaining child was attacked by varicella, which, as the author does not indicate otherwise, presumably ran a normal course. In Haward's[4] case, also that of an ill-nourished child, aged one year, which terminated unfavorably, the temperature, as in our patient, reached 104°; there was dulness on percussion over the base of the right lung. The immediate cause of death was pyæmia. The necropsy revealed the presence of small abscesses in each lung; on the surface of the left pleura there was recent lymph, and two ounces of pus in the pleural cavity.

In a fatal case, recorded by Payne,[5] acute miliary tuberculosis was found on autopsy. This coincidence, the author states, might be entirely accidental, but possibly it might be an important factor in the occurrence of the eruption.

Bowly[6] and Radcliffe Crocker[7] have also met with examples of the

[1] Lancet, October 29, 1881, p. 751. [2] Ibid.

[3] A Case of Varicella Gangrenosa, by John Abercrombie, M.D.: Transactions of the Pathological Society of London, vol. xxxi. p. 333.

[4] A Case of Gangrenous Varicella, by Warrington Haward: British Med. Journ., 1883, p. 904.

[5] Lancet, May 30, 1885, p. 987. [6] Ibid. [7] Ibid.

affection. Bowly's case was apparently cured, but the day subsequent to its discharge it died of convulsions.

Besides several cases terminating in recovery, Crocker has observed two fatal cases, in one of which there was a strong history of tuberculosis. According to the latter author, the gangrenous condition need not necessarily arise from the varicellar vesicles, but may develop independently of it in the skin not the seat of the eruption. This mode of origin of the gangrenous patches rests solely with Crocker, and lacks confirmation from other sources. Moreover, he states that gangrene may set in at the onset of the disease, or during the subsidence of the varicellar eruption.

In reviewing the histories of the cases recorded, we find lowered vitality of the patient almost universally emphasized, and in many there was a distinct history of tuberculosis, confirmed by the presence of tubercles on autopsy. Hutchinson, however, as has already been stated, denies the influence of a constitutional taint, and is of the opinion that the gangrenescence of the varicellar lesion is simply due to idiosyncrasy of the patient.

Concerning the etiology of our case, it should be mentioned that the child was of healthy family; there was no history nor any manifestation of syphilis, tuberculosis, or scrofula in the parents nor in the patient. The family had but recently returned to New York from New Jersey, where they had lived for about a year in a malarious district, and where all of them were attacked by various forms of malaria, but especially so our patient, whose health was thereby considerably undermined.

The main cause for the pernicious course of the disease, however, must be sought in the surroundings of the patient. In the rear of a butcher shop, separated from the latter only by a thin board partition, was the bed-room, where the child constantly sojourned. Dark, scarcely admitting a ray of daylight, necessitating the continuous burning of gas, ill-ventilated and damp, it furnished all the conditions favorable for the generation of pathogenic microörganisms. And to this, rather than to any constitutional taint, must the gangrenescence of the lesion be attributed. It is but reasonable to infer that we have to deal here with a twofold infection—that of the varicellar virus with that of septic microbes superadded, though, unfortunately, the bacteriological proof is wanting.

REVIEWS.

A System of Obstetrics by American Authors. Edited by Barton Cooke Hirst, M.D. Volume II. Illustrated with two hundred and twenty-one engravings on wood. 8vo., pp. 854. Philadelphia: Lea Brothers & Co., 1889.

This volume concludes the series of treatises contained in four volumes and known as the "American System of Gynecology and Obstetrics." The opening contribution, by Dr. Theophilus Parvin, is upon "Diseases and Accidents of Labor." It is to be regretted that in an encyclopædic work the author did not go into the etiology of "tears of the neck of the uterus," as he terms it, from the purely obstetrical standpoint. In the gynecological volume Dr. Bache Emmet has given it an ample surgical exposition, but the subject of laceration of the cervix has two aspects. The surgical gynecologist is rarely an obstetrician, as from the arbitrary nature of his engagements it is nearly impossible for him to respond to cases in this department of practice. Conflict of opinion has thus come between men who ought to deal intelligently with common facts. We constantly hear worthy practitioners held responsible for lacerations of the vaginal portion. Is faulty handling of parturition responsible for this accident, or is it the result of certain physical conditions or error in the physical forces engaged in the act? This is the question that authorities in obstetrics have to answer, and it is a subject of regret that one so competent as Dr. Parvin to give an authoritative opinion has neglected the present opportunity. Believing, as we do, that it is the result of conditions other than manual or instrumental interference in the conduct of labor, we are daily seeing the need of more careful study of the subject. Strange to say, what attention has been given to it was from the gynecological aspect of the injury, and not from the obstetrical. Of course, a certain, but very small, proportion of these cases is due to necessary interference in the natural mechanism of labor, but these are excluded. But what are we to say to the woman who believes that her injury is due to carelessness or ignorance on the part of her physician, and who makes a reasonable request for information as to what obstetricians may have to say upon the subject? Already the reviewer has been upon the witness-stand in one case of this nature, and the remarkable silence of obstetrical writers upon this subject was one of the grounds upon which the prosecution based their case. Possibly in the next edition of his own book Dr. Parvin may see his way to an authoritative expression of opinion.

Injuries of the Perineum follow, and upon this time-honored subject the author cannot be criticised for want of attention. To the young practitioner the author does not give much encouragement in prophylactic treatment. Inversion of the Uterus calls for a short but clear

statement. Hemorrhage in placenta prævia is next studied, and those who adhere to the classic tampon may have the courage to say so openly henceforth. Injuries to the Child during Birth is one of the most lengthy sections of Dr. Parvin's contribution. Sudden Death during or following Labor, and Disease of the Mother with Reference to Labor, conclude the section.

"The Forceps and Embryotomy," by Dr. E. P. Davis, is a well-illustrated paper. Concerning the application of the forceps, the author calls attention to a fact worthy of notice here. The French, he says, admit rotation of the head with the forceps in high application, the Germans do not apply the forceps until rotation has occurred, while the English and Americans apply the forceps to the sides of the pelvis. If the latter method is the operator's custom, the author's advice is to continue the practice. This reminds us of the noteworthy paper of Dr. Clark, of Oswego. Here the systematic writers are taken to task for directing a method of application that is never carried out at the bedside. Forceps are applied just as traction is made, with reference to the maternal parts and without any regard to the part of the child that is in advance in the birth-passage. Since the true use of the forceps as a traction, and not as a restitution, instrument has become more clearly defined, the use of the instrument has greatly increased, to the infinite benefit of women. Vesico-vaginal fistula from impacted head, from being a very common accident, is now very rare. The clinical use of the forceps is entirely a different matter from the didactic theory of its application. This is quite a modern notion, and has followed largely from the increased attention attracted to the subject by the labors of Tarnier and others, and now depends on the simple theory that both the instrument and its application must favor traction, and without regard to the presenting part.

Embryotomy forms the conclusion of this section. Whether the future will be one of Cæsarean section or embryotomy will depend largely on a consensus of opinion. The methods have been largely improved, antisepsis has become the obstetrical law of the land, and all that is needed to settle a question of great practical importance like this is a general consent in opinion. Our author leans toward what he calls the "conservative procedure"—that is, the section. For the performance of embryotomy a knowledge and observance of antisepsis are requisite equal to those demanded for Cæsarean section. The technical skill needed to perform a difficult embryotomy is fully as great, if not greater, than that which the Cæsarean operation calls into play, while the instruments employed for the destructive operation are more complicated. That the outlook for the Cæsarean operation in the United States will improve there can be no doubt.

"Premature Induction of Labor," by Dr. Cameron, of Montreal, and a lengthy contribution on "Version," by the same author, follow. Concerning what we may term the ethnology of version and the forceps, Cameron makes the interesting comparison that in Germany turning is the favorite operation, that in France the axis-traction forceps has greatly displaced manipulation, and as pelvic deformity is comparatively rare in England and America, hence, except among emigrant population version is rarely practised. Among Americans impediments to the exit of the child are rarely at the brim, and are generally found at the outlet, which has caused the forceps to be so often resorted to that "America

has been aptly styled the home of the low forceps operation." Cameron makes one statement of singular ethnological importance if true. "Placenta prævia is very common in Central Europe, and is comparatively infrequent on this continent."

Dr. Robert P. Harris writes the section upon the "Cæsarean Operation, Symphysiotomy, Laparo-elytrotomy, and Laparo-cystectomy." This contribution is very timely, and allows its author to go over the whole subject in a connected and systematic manner. It is needless to say that no one is as well equipped to do justice to this subject in America as the author. Space will not allow the attention that this carefully prepared paper deserves.

One of the most valuable sections of the volume is by Dr. Garrigues on "Puerperal Infection." At the outset, however, the author mars his work by what we fear is a constitutional failure—a stickling after terms; a desire to become so accurate that he becomes obscure. Thus, when he says that "septicæmia is too strong a term" for puerperal fever, is he not using language a little too strong for the subject—what to the minds of some modern bacterial obstetricians may be called obstetrical profanity? The author has done valuable and permanent work in this field and deserves the recognition that has been accorded him in the opportunity of writing this interesting contribution.

The author begins by the general pathology of puerperal infection, basing his etiology solidly on the theory that the invasion of the system is due to infection and not contagion. We have no time to refer to anything among the many matters of interest except the preventive treatment. In this age if we wish to anticipate the medicine of the future there is one thing better than pathology or treatment, and that is prevention. Since the first of October, 1883, the author has had ample experience in preventive measures. He treats them separately, first the hospital, the attendants, and lastly the patient. He says, "At the hour of writing it is just five years since I introduced the bichloride of mercury treatment in the Maternity Hospital. During that time it has been kept up without any change, and the results have been so satisfactory that I feel very little inclined to make any." Cautions are, however, expressed concerning the danger of poisoning from this agent, and the history of many cases given. The author in his own hospital experience has never had a fatal case of mercury poisoning. We believe that the solution recommended by him is too strong; 1 to 2000 is not safe in the hands of the general medical and nursing public. In the uterus and genitals we never have exceeded 1 to 3000, and the coagulating effect of this solution is excessive. A solution so strong as to produce rapid coagulation of albuminous fluids is liable to defeat the very purpose for which it is used, by covering the surface which it is desired to disinfect with a layer of insoluble coagulum. This is a very practical point and one of special importance in disinfection of the genital tract bathed in an excess of secretion, as it is just previous to parturition.

The experience of Garrigues coincides with that of all modern bacteriologists concerning the unreliable character of carbolic acid as a disinfectant. He is now experimenting with creolin. One advantage over bichloride is its slippery nature. He says: "I was most agreeably surprised in a case of turning to feel my hand slip through the vagina and cervix with a hitherto unknown facility after a vaginal douche of 2 per

cent. had been given." In this respect its effect is different from the bichloride solution, which has a strong astringent power. The author has been to considerable care to ascertain the rate of mortality of childbirth in large cities; abroad a per cent. of 1.12 is reached, and not much better in New York City, 1.06 per cent. "So much is sure," says the author, "that out of every one hundred women who give birth to a child in a private house in New York, one dies during or shortly after labor." In the performance of a natural function, that is too high a death-rate, and there is yet a margin for improvenent. But what must it have been before the art was brought to its present refinement—when Semmelweis was not yet.

Dr. Garrigues also contributes the paper on "Inflammation of the Breasts and Allied Diseases connected with Childbirth."

Dr. Harold C. Ernst, in the "Etiology of Puerperal Fever," to have been rightly placed in the volume ought to have preceded Dr. Garrigues' article on puerperal infection. The former considers the subject from the laboratory standpoint, and the latter from the clinical. It is only necessary to give Dr. Ernst's definition to foreshadow his whole thesis. "It is allied to, and in fact is exactly similar to, any other of the septicæmic or pyæmic conditions . . . . . which arise more commonly in connection with surgical affections." Ernst has written a very valuable paper, and has collected all the available material upon the subject.

The editor, Dr. Hirst, takes up the subject of "Complications of the Puerperal State Independent of Septic Infection." This topic includes defective involution of the uterus, repair of the injuries of childbirth, puerperal hemorrhage, displacements of the uterus, hæmatoma, carcinoma of the corpus and cervix, fibroids, non-infectious fevers, pneumonia, pleurisy, the exanthemata, diseases of the urinary system, gonorrhœa, abnormalities of the milk secretion, and relaxation of the pelvic joints. A vast subject is well disposed of in one hundred and eighty one pages in a very practical manner.

Dr. Lloyd next takes up the subject of "Insanity and Diseases of the Nervous System in the Childbearing Woman." Puerperal Insanity is treated of in an elaborate monograph of forty-five pages, followed by the same amount of space given to the subject of Occasional Neuroses of Pregnancy.

Dr. J. Lewis Smith, of New York, takes up the subject of the "Management of the Diseases of the Newborn Infant," which supplements the article in Volume I. on the management of the newborn infant. It need not be said that the article is a masterpiece on the subject, and constitutes a volume in itself. No hand-book on obstetrics in any language contains anything like its equal on the subject in elaboration and practical details. A considerable amount of the matter is new in book form, and it is a misfortune to the reader that space prevents an analysis of the author's views.

Dr. Stephen Smith, of New York, contributes the section upon the "Surgical Diseases of Early Childhood," which is freely drawn from his work on the *Principles and Practice of Operative Surgery*. Surgical conditions of the umbilicus, supernumerary members, congenital union of the fingers and toes, cephal-hæmatoma, atresia of the mouth, harelip, fissured palate, absence of the tongue, macroglossia, and intestinal obstruction. Concerning laparotomy in the treatment of the latter, the

author evidently holds no high opinion. In some post-mortem examinations after the invaginations were very recent, which have come to the knowledge of the reviewer, adhesions were so firm that they could not be separated without tearing the intestine. We are convinced that it is not an operation which may be informally suggested after considerable time when all other measures have failed. Adhesions in invaginated intestines in a few hours would be too firm to be safely separated. Excision of the incarcerated portion would be the only safe method. In the case of an obstruction of a week's duration the writer declined to operate on these grounds. The rectum, the anus, hydrocephalus, cephalhydrocele, and spina bifida are well described and illustrated. Extroversion of the bladder and hernia are well illustrated with working drawings. Fractures and club-foot conclude the paper. These two last-named contributions are the best and latest expositions of the subject now before the profession, and will repay of themselves the somewhat large outlay in the work.

Dr. De Schweinitz treats of the "Congenital Anomalies of the Eye," and will be a great help to a proper understanding of the rare defects in the eyes of the newborn.

On the whole, the children have fared well in this volume of the American System, so that the whole field of normal and abnormal conditions of mother and child are presented to the reader in the most complete form of any work the reviewer has seen. The best writers have been carefully selected by the editor, names that alone afford a guarantee of careful and efficient work. None but a carping critic will find fault. There are many things put forward, possibly, by the men of vast experience and most self-reliant character who have contributed the more important sections, that many in the profession are not yet prepared to accept without argument. This must and ought to be the case in an exhaustive work that is in all its parts in line with the most advanced thought. In the English language there is no work on its various topics at all to be compared with it, and we may send it abroad without any fear that it will not be able to command the respect that it deserves.

In one matter alone the work as a whole is most complete and is destined to accomplish an unlimited measure of good in the future of American obstetrics; this is in childbed sanitation, or, as it is more commonly known, antiseptic midwifery. But if we are to educate the people to this gospel of cleanliness, we must give it a better name. Not only must it become an obstetrical law, but it ought to be the law of every intelligent woman. She must be taught that her chief danger in becoming a mother exists not in the act itself, dread it as she may, but in conditions that she, her nurse, and her doctor are perfectly able to prevent. That the people and the physicians who go into their homes are not yet educated up to the level of modern childbed sanitation is proven by the fact that domestic midwifery and hospital practice have changed places in their relation to mortality. More lying-in women in their homes die of dirt diseases, no matter how well surrounded, than their poor sisters in the lying-in wards of a hospital.

Antiseptic midwifery is not the rule in private practice even among men of good reputations. He may carry his corrosive tablets and wash his hands, a matter he may have neglected in years gone by, and now flatters himself that he occupies a foremost place in antisepsis, but he

ends here. He must be taught that this is not childbed sanitation. Again and again must the matter be brought to his understanding, and if in one generation a great revolution, partly of practice and partly of morals, is brought about, we may well be content. We believe that no recent work will contribute so much to this end as that which is here reviewed. Everywhere this practice is insisted on and taught in its most elaborate detail and will secure constant reference for a long time to come.

The publishers have mechanically turned out a work very nearly perfect. They have been liberal in the matter of illustrations—a subject that does not always run smooth between writers and the publishers in coöperative works, but here the authors have nothing to complain of. It is to be regretted that the general index at the conclusion of this volume is not as complete as it ought to be in a work of such encyclopædic character.

E. V. De W.

The Operative Treatment of the Hypertrophied Prostate. By Francis Sedgwick Watson, M.D. Pp. 167, with 34 photogravure plates. Boston: Cupples & Hurd, 1888.

In this elegantly printed and illustrated work the author has collected anatomical and clinical data with the object "to supply, or, at least, to suggest, a rationale, based upon an analytical study of the actual conditions that are encountered, in the hope of placing this whole subject upon a rational basis that may serve as a ground for future operative action." He begins with a brief account of the various methods of operation, palliative and radical, heretofore employed, and follows it with a review of the indications for operation, and of the state of surgical opinion upon the subject at the present time. He then gives representations of actual size by photogravure of thirty specimens of enlarged prostate, brief clinical histories of 45 cases of prostatotomy or prostatectomy, tabulates the results, and closes with a few conclusions.

The study of the specimens shows that in 27 of the 30 cases median enlargement of the prostate formed the chief obstacle to urination, and that in 21 cases it "could have been successfully reached and incised, or partially or wholly removed, through the perineal route, by any one possessing an index finger which has a reaching length of three inches or more;" and that in 10 cases the bladder was so small that the supra-pubic operation would have failed. In 7 cases the distance of the median enlargement from the perineum was so great that a perineal operation would have failed.

The clinical data of radical operations show a mortality of 17 per cent., 8 deaths in 45 cases; and that 18 of the patients "were relieved, at any rate, for one year." "Of 19 palliative operations by drainage, 5 were relieved, at any rate, for one year."

He recommends: "In a given case (suitable for operation) open the membranous urethra, put in your finger and explore. Twice out of three times the operation can be completed by this route. In the other third of the cases, the long perineal distance, or the form of the median enlargement, will make the supra-pubic operation necessary."

In cases in which the patient's condition will not permit the radical operation, drainage through the perineum is ordinarily the best.

We note on page 162 a singular blemish in so well prepared and scholarly a work, *fenestrum* for *fenestra*. L. A. S.

DIE MIKROORGANISMEN DER MUNDHÖHLE. DIE ÖRTLICHEN UND ALLGEMEINEN ERKRANKUNGEN, WELCHE DURCH DIESELBEN HERVORGERUFEN WERDEN. Von W. D. MILLER, Dr. med. et phil., Professor am zahnärztlichen Institute der Universität Berlin.

THE MICROÖRGANISMS OF THE MOUTH; THE LOCAL AND GENERAL DISEASES CAUSED BY THEM. By W. D. MILLER, M.D., Ph.D., Professor at the Dental Institute of the University of Berlin. 8vo., pp. xx., 305; 112 illustrations and 1 colored plate. Leipzig: Georg Thieme, 1889.

THE need has long been felt of a work presenting clearly our knowledge of the microörganisms of the mouth, and of their relations to diseases of the general system as well as to those of the oral cavity itself. Up to the present time the literature of the subject has been scattered through numerous periodicals in several languages. In the book before us Dr. Miller has collected the authenticated facts in this department of mycology, so many of which he himself contributed. But his book is far from being a mere compilation, for in it are to be found many new observations by its author, making it of unusual interest.

Being intended as much for the use of the dentist as for that of the physician, it has seemed wise to present at the beginning a short summary of our knowledge of the properties of microörganisms in general, and especially of their relationship to fermentation and disease. The mouth is then shown to afford all the conditions necessary for their growth. It is accordingly not to be wondered at that certain species should be almost constant inhabitants of it; indeed, a number of these have thus far shown themselves to be incapable of growth outside their usual abode. Beside the twenty-two varieties described by the author in the *Independent Practitioner*, in 1885, thirty new species have been cultivated, seven of which occur with sufficient frequency to warrant their description in the text. It is shown that these microörganisms of the mouth differ in no essential feature from other germs in their relations to putrefaction and fermentation; but that, in addition, a number of them have the power of converting albuminoid substances into peptone. The lactic acid fermentation was found to be the most frequent, the acetic and butyric acid fermentations being thought by the author not to take place under ordinary circumstances in the mouth.

On page 91 begins an extended discussion of the causes of caries of the teeth. The various theories which have been advanced in explanation of this process are reviewed and discarded as untenable. This can hardly excite surprise when it is known that most of them antedate the present century. By way of example, we may cite the theory prevalent in the time of Scribonius (43 A. D.), that dental caries is due to the presence of worms in the teeth, a theory which, by the way, has survived

to our day among the laity in China, and affords the Chinese dentist opportunity to exercise his propensity for juggling. He is said to conceal a number of small worms in a hollow tube, the end of which is introduced into the mouth of the patient. At the proper moment, when an opening into the aching tooth is supposed to have been made, the worms are skilfully ejected from the tube into the mouth of the sufferer, who immediately experiences much relief!

The recital of the author's own investigations into the causes of caries occupies nearly one hundred pages. It is impossible within the narrow compass of a review to give their details. Suffice it to say, that the theory which he educes at the end is based upon careful study of a very large number of cases, and is apparently most rational. He believes certain fermentations, chiefly the lactic acid, to be necessary precursors of any carious erosion of the teeth. These fermentations he has shown on a previous page to be of frequent occurrence in the mouth after the ingestion of carbohydrate foods. The acids thus generated form soluble compounds with the lime salts of the enamel, thus preparing the way for the lodgement of microörganisms on the roughened surface of the tooth. These continue the process. So far as the enamel is concerned, the process is essentially one of erosion of the surface, there being no penetration of the dense substance of the enamel by microörganisms, but in the case of the dentine it is different. Here the canaliculi are of sufficient calibre to admit of the entrance of microörganisms, and the process is carried on in the substance of the dentine as well as on its surface. Wherever the carious softening is progressing in the dentine, vast numbers of bacteria are found filling the canaliculi, many of which show the effects of their action in the irregularity and widening of their lumina, due, it is thought, to the digestion and absorption of the surrounding dentine. This process is not ascribed to any one species. Micrococci and bacilli of various species are found to take part in it, sometimes one predominating, sometimes another.

Artificial caries was produced by the author by allowing sound teeth to lie for a considerable time in mixtures of fermenting food and saliva. The caries thus produced presented all the appearances of that produced in the mouth. The caries occasionally found in the teeth of animals differs in no essential way from that in man, and is thought to be due to the same causes.

As predisposing conditions are mentioned softness of the enamel, deep fissures and cracks in it, irregularity of the teeth, retraction of the gums, etc.

Miller believes that his theory explains satisfactorily the low percentage of caries among races living upon a purely animal diet, since the fermentation thought by him so essential to the process, could not occur in the absence of carbohydrates in the food.

As prophylactic measures are recommended frequent cleansing of the teeth and mouth with antiseptic washes, among which Listerine is mentioned as agreeable and efficient.

The growing importance attributed to microörganisms in the etiology of disease makes the knowledge of their modes of entrance into the body of the greatest importance. The remaining third of the volume is devoted to the discussion of the various diseases of the mouth and general system dependent upon the introduction of pathogenic microorganisms from the mouth. Here, too, the original work of the author

is very apparent. After description of nine pathogenic species previously studied, four new ones are added as the outcome of his own investigations.

Among the diseases of the mouth, to the knowledge of which the author has contributed, may be mentioned "pyorrhœa alveolaris," a chronic suppurative inflammation of the periosteum of the tooth, with more or less intense inflammation of the gum and necrosis of the alveolar process. This he concludes to be due to the action of no one specific germ, but to that of any one of a number, acting upon a system much reduced by other disease.

Special stress is laid upon the importance of the mouth as a point of entrance for microörganisms in diseases of the pharynx, larynx, lungs, and alimentary tract, and it is pointed out that in operations about the mouth we have the conditions most conducive to infection of the blood and through it of the body in general. Thorough antisepsis is, consequently, most essential.

In conclusion, short mention is made of the various yeasts and moulds which have been found in the mouth by various observers.

The volume is well printed and abundantly illustrated. A copious bibliography and index add very materially to its usefulness. Its perusal is recommended to all those interested in following the growth of our rapidly increasing fund of information upon the relations of microorganisms to disease. J. S. E.

TRANSACTIONS OF THE AMERICAN ORTHOPEDIC ASSOCIATION. Vol. I. 8vo., pp. 303. Boston, 1889.

THIS is an exceedingly interesting volume, containing the transactions of the first and second annual meetings of the American Orthopedic Association. The first twenty pages only are devoted to the first meeting, which was held chiefly for the purpose of organization. The articles are all by men recognized as specialists in this important branch of surgery, and for scientific interest and practical value represent a collection of monographs on orthopedic subjects that is unique. They are all so uniformly excellent that it is difficult to select those which would be of most interest to the general readers.

Dr. V. P. Gibney contributes a "Report on the Treatment of Clubfoot by Means of the Thomas Wrench," in which he commends the simplicity of the instrument combined with tenotomy, and the subsequent use of ordinary shoes built higher on the outer side, and records twelve cases thus successfully treated.

Dr. E. H. Bradford also contributes a paper on the "Treatment of Clubfoot," to which is appended a table of one hundred and one cases, with a record of results and detailed notes of illustrated cases. The subject is handled in a masterful and impartial manner, is illustrated with numerous drawings, and there is a ring of sincerity that will please the general surgeon. In summarizing, he says: "In no branch of surgery can a cure be more confidently promised than in the treatment of clubfoot, and in few surgical undertakings do half measures occasion greater annoyance" (p. 112).

Dr. Royal Whitman presents his "Observations on Seventy-five Cases of Flatfoot," in a paper of considerable value, and offers to the profession a brace of thin, tempered steel (to be worn inside the shoe), with which he has obtained the best results. It resembles somewhat the plantar spring of Dr. Roberts, but differs from it in being inelastic, and being made upon a special plaster-cast taken from the foot, placed at right angles to the leg and slightly flexed at the medio-tarsal joint. The brace (as he prefers to call it) is short, and is applied in such a manner as not to interfere with any of the natural movements of the foot.

Dr. De Forrest Willard's paper on "Osteotomy for Anterior Curvatures of the Leg," is able and instructive. It is, in fact, one of the best papers on the subject that has been written, and its author can speak authoritatively from a large experience. In speaking of the cases in which forcible fracture *versus* osteotomy should be employed, he considers that for children under three years the former (forcible manual fracture), and over three years the latter operation (osteotomy), is to be preferred, sclerosis or hardening having occurred in the latter cases. This is a good practical rule, but in doubtful cases recourse should be had to the bone drill to determine the exact density of the bone, and preferably the cog-wheel drill of Colin, of Paris.

The paper of R. W. Lovett, of Boston, "An Experimental Study of Fixation and Traction in the Treatment of Hip-disease, with the Description of a Splint," presents the results of a number of experiments to determine what degree of fixation occurs in using the traction hip-splints, especially the Taylor splint with a rigid waistband encircling the pelvis, and two perineal straps instead of one. The results showed "that traction in itself furnishes very incomplete fixation, and cannot be regarded as in itself a means of fixing a diseased hip-joint in the treatment of hip-disease; and that a Taylor hip-splint, with a rigid pelvic band and two perineal straps, furnishes much more complete fixation to the joint than the newer form of splint with only one perineal band." In conclusion, he exhibited a splint which was merely a modification of the English Thomas splint with an American Taylor splint, to be employed in certain bad cases as a means of furnishing fixation and traction while the patient goes about on crutches. This supplies an apparatus for which every surgeon who sees many of these cases has wished, and deserves a fair, unprejudiced trial.

A somewhat similar brace, combining the same principles, has been more recently recommended by Dr. A. M. Phelps, of New York.[1]

This paper brought out the two principles underlying the modern treatment of chronic joint disease—immobilization as opposed to extension with motion—principles which have always been the *causus belli* wherever the names of Thomas and Taylor are known; and these were again discussed when Dr. V. P. Gibney's paper on "Immobilization in Articular Disease" was read. Dr. Gibney's concluding remarks on this subject are very positive and important: "In concluding, let me state firmly my belief that whatever ankylosis occurs in a joint which has been subjected to immobilization, occurs not by reason of the immobilization, but of the nature and intensity of the inflammation, and of the inefficiency of the apparatus employed."

It was proven that the most important factor to the treatment of joint-

[1] The Medical Record, May 4, 1889, p. 477.

disease was immobilization, and we believe, as Dr. Phelps remarked in the discussion, that "the more perfectly a joint is immobilized the better the results will be, but that immobilization *cannot be accomplished without extension.*"

This volume contains also a well-written and practical article on the "Etiology and Pathology of Rachitic Deformity, with a Report of One Hundred and Fifty-eight Consecutive Osteotomies without Suppuration," by Dr. Charles N. Dixon Jones. In speaking of the etiology, he supports the views of Dr. W. B. Cheadale, that primarily rachitis is a diet disease which can be produced at will, the chief defect being a want of animal food, with a deficiency of phosphates and animal proteid, accentuated by evil hygienic conditions, and modified by the concurrent existence of congenital syphilis and scurvy. Speaking of its surgical treatment, he condemns the osteoclast as "an instrument of tremendous and brutal power," and advocates successive osteotomies combined in some cases with tenotomies, having in one case performed as many as eighteen osteotomies. Doubtless, in the hands of skilful surgeons who observe all due antiseptic precautions, this operation is entirely free from danger, but it must not be forgotten that at least four deaths have resulted from osteotomies, besides numerous cases of severe local and constitutional disturbances. Again, as Dr. Phelps remarked in discussing Dr. Vance's paper on "Femoral Osteotomy," "such cases (septicæmia) should not be classed as deaths from osteotomy, but charged up to the accident of the operator" (p. 164). No deaths have yet been reported from osteoclasis, and hence, for general recommendation, in the shafts of long bones away from joints where osteoclasis will lead to the same result, it is the safer and simpler procedure. The author's method of suspending the limbs after osteotomy is excellent, but the same has been in use for some time in Dr. Rupprecht's wards in Dresden. Altogether, the article is a valuable contribution to the subject of rachitis, and the surgical treatment of the deformities resulting from it.

Notwithstanding the seldom occurrence of double hip-disease, Dr. John Ridlon has recorded fourteen cases which have come under his observation since 1884. He holds that:

"The disease seldom *begins* in both hip-joints at the same time; and the *second* joint may become diseased while the patient is resting in bed under treatment for the *first* joint. In other words, *traumatism* can be excluded from the elements of causation of the disease in the second joint in very many cases.

"The joint that is first affected is often last to recover. This would seem to be due to the fact that before *both* joints are involved, and after one has recovered, the patient is allowed to walk around, giving the *one* diseased hip both pressure and motion, thereby delaying the cure and forming ankylosis with flexion and adduction.

"The duration of the disease in the *first* hip is usually somewhat less than that of the average case of hip-disease, while the duration in the *second* hip is usually much less than that of the first. This, it seems to us, can only be accounted for by the fact that during the time that both hips are involved the patient is kept pretty rigidly in bed, thus removing the superincumbent weight, and by that much diminishing joint destruction."

In regard to treatment, the weight and pulley was found uniformly to relieve pain, but to prevent flexion, adduction, or spontaneous sublaxation after abscess the application of the double long traction splint was much more effective, and gave better results "when used upon a patient

confined to bed during the acute stage of the disease" than when used as an aid to locomotion. The author favored the double hip-splint of Thomas, which, he says, "serves a better purpose." "The more absolutely quiet the patient be kept, and the longer the period of quiet, the shorter will be the duration of the disease and the better the ultimate result." Only one of the cases died, "and that from tubercular meningitis supervening at the time when the general health was good." This is a valuable contribution to our meagre knowledge of this subject.

One of the best papers in the collection is from the pen of Dr. Newton M. Shaffer, "On Some of the Deformities of the Tarsus in Congenital Equino-varus," whose skill in applied mechanism has accomplished so much to relieve these deformities without operative interference. In considering the subject from an anatomical standpoint, he assumes

"the following as a basis to treat the conditions under consideration: First, that there is a compound deformity in equino-varus, due to rotation of all the bones of the tarsus upon three distinct axes—that is, transverse, antero-posterior, and vertical; secondly, that this compound deformity is due to a loss of relation between muscular and osseous growth, not to muscular contraction or contracture, as has generally been supposed; thirdly, that the principal obstacles to the reduction of the deformity are (1) the position acquired by the astragalus with or without an intrinsic deformity of the neck, and (2) the ligamentous shortening; fourthly, that these difficulties are much increased by the progressive ligamentous and osseous changes that occur as the direct result of prolonged malposition; and fifthly, that the deformities of the medio-tarsal joint are secondary in importance to those which occur at the astragalus" (p. 297).

The mechanical treatment is directed to overcome each of these three varieties of rotation—the *transverse* at the elevated heel; the *antero-posterior* at the inward rotation of the os calcis; and third, the *vertical*, the inversion of the entire foot. Speaking of the structures which resist restoration, he regards the internal lateral ligament "as being far more important than the gastrocnemius or plantar shortening," and says: "If we can find some means to overcome this shortening of the internal lateral ligament, I am sure we will find that the duration of the treatment of congenital equino-varus will be very materially shortened, and much better and far more permanent results will be secured" (p. 299).

In the new apparatus presented, the traction force applied to the outer side of the leg and foot is more accurate, simple, and powerful than the pushing force.

The volume is an excellent specimen of the printers' art, and reflects great credit on the Association. J. K. Y.

DISEASES OF THE SKIN. By W. ALLAN JAMIESON, M.D., F.R.C.P.ED. Second Edition, Revised and Enlarged. 8vo., pp. xvi., 573. Edinburgh and London: Young J. Pentland, 1889.

THE present edition, following so soon after the first, "has not," as the author states, "permitted sufficient time to elapse to render necessary any extensive alterations in the plan of this work." And yet, in looking over the text, it is found that in several particulars important

changes have been made, two new chapters, on epithelioma and hygiene of the skin respectively, incorporated—in all adding about thirty pages of new matter.

This volume, like its immediate predecessor, reflects in a great measure the teachings of British dermatology, although it also contains much that has been imbibed from Unna's methods and writings, due credit for the same, however, being given to that indefatigable worker. This publication is not as elaborate or exhaustive as most of its contemporaries, but the subject-matter is presented in a clear and concise manner, and the therapeutical directions, while evidently for the most part based upon the author's own practice, are intelligible and free from discursiveness and ambiguity. We note that our English *confrères* still cling to the belief of the non-existence of Hebra's prurigo as a disease, and also hold to the earlier applications of the term "lichen."

An innovation that deserves mention is the plan of giving, at the end of each chapter, references to the several atlases in which the various diseases immediately discussed may be found clearly depicted. The volume itself contains eight colored illustrations, but these, with one or two exceptions, can scarcely be considered creditable productions.

H. W. S.

SURGICAL OPERATIONS. Part II. AMPUTATIONS, EXCISION OF JOINTS, OPERATIONS ON NERVES. By SIR WILLIAM MACCORMAC, Surgeon and Lecturer on Surgery at St. Thomas's Hospital, London. 8vo., pp. 135–490, with 256 illustrations. London: Smith, Elder & Co.

OF the 350 pages contained in this, the second and much the larger part of what is still an uncompleted work, the author has given half to amputations, one-third to excisions, and the remainder to operations upon nerves, but it must be noted that a very large part of the space is given up to the exceptionally numerous, large, and well-executed woodcuts; by actual measurement of those found in fifty consecutive pages, chosen at random, it appears that more than sixty per cent. of the space is thus employed.

The first sixty pages are devoted to general considerations upon amputations, including the indications therefor, the preparation, mode and time of performance, and a comparison of the principal methods; then follow descriptions of individual amputations and disarticulations, each being preceded by a brief statement of the injuries or diseases which may require it, and a longer or shorter description of the anatomy of the region. Occasionally the relative merits of rival operations are discussed, and the mortality indicated by statistics, which are, unfortunately, drawn in large part from pre-antiseptic days. The same plan is followed in the remaining two sections, much space being given in the last one to the anatomy and distribution of the nerves.

The descriptions of the operations are clear and sufficiently detailed to meet the needs of the practitioner who has already had some experience in surgery, and it is evidently for this class, rather than for the student who desires to practise upon the cadaver, that the book has been prepared. This is additionally shown by the introduction of much material that does not belong, strictly speaking, to operative surgery, such as the

means of diagnosis in many cases, complications and results, and some rather lengthy statements of contradictory or restricting opinions held by various surgeons concerning the choice of methods of treatment or of operations. It is usually left to the reader to determine to which opinion the greater weight should be given, the author contenting himself with an indication of the points to be considered. To those fitted by experience and training to profit by it, the book will be of great value.

The paper and type are excellent, and the woodcuts of unusual merit.

L. A. S.

EXPLORATION OF THE CHEST IN HEALTH AND DISEASE. By STEPHEN SMITH BURT, M.D., Professor of Clinical Medicine and Physical Diagnosis in the New York Post-Graduate Medical School and Hospital; Physician to the Out-door Department (Diseases of the Heart and Lungs) of the Bellevue Hospital. 12mo., pp. 206. New York: D. Appleton & Co., 1889.

THIS little book is evidently the work of a teacher. The author has well-defined opinions, and is accustomed to clear expression of them. The teaching itself is usually good. We do not altogether agree with some of Dr. Burt's explanations of the mechanism of the various normal and abnormal sounds heard upon auscultation and percussion; but as the points of difference are still *sub judice*, we have no adverse criticism to express in this respect. We cannot agree with the author, that true, limited "whispering pectoriloquy" is heard over merely solidified areas of lung-tissue. There must be some continuous hollow conduction. It is the voice of the speaking-tube, not of the telephonic rod. We do not see what is gained by the enumeration of "calormetation" among the methods of physical exploration of the chest, or by the substitution of this term for "thermometry." If surface-temperature were meant, we might assent to the position assigned to heat among the physical signs of thoracic conditions; though even then it would tend to distract the attention of the student from the fact elsewhere properly emphasized by the author, that physical exploration of the chest reveals only mechanical (or physical) conditions, and not pathological states. But temperature simply serves with other objective and subjective phenomena to aid us in interpreting the pathological significance of the physical conditions discovered, and should not be enumerated among the conditions it is to explain. With this exception, we can commend the book as among the best of its class, both in design and in execution.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Nitroglycerine, especially in Cases of Emergency.

Dr. Joseph B. Burroughs has recently called the attention of the profession to the effects of this drug, the rapidity of its action, and lack of taste when taken in water. It was introduced into medical literature as a remedy in neuralgia and nervous affections about thirty years ago. About ten years ago Dr. Murrell recommended it as a useful means for the relief of angina pectoris. It may be had in the form of pills, perles, and triturates, as well as in the form of a one per cent. solution. This last is least liable to change and is the handiest to use. Care should be taken to keep the bottle tightly corked or by evaporation the strength may be increased.

One drop is a dose of the one per cent. solution; this may be taken in water, the physician dropping ten drops into a tumbler and adding ten teaspoonfuls of water; one teaspoonful now representing one drop of the remedy. If there is need of great haste, or if the patient cannot swallow, from being unconscious, one drop can be placed within the lower lip or upon the tongue; the drug may be given subcutaneously, but so rapid is its absorption through the mucous membrane of the mouth, that unless the syringe should happen to be filled it is doubtful if time would be gained. Patients differ in the amount required to produce an effect: some requiring less than one drop, others requiring three or four drops to produce the same effect; the usual dose, however, is one drop.

Patients also differ in the duration of the effect of the drug. Usually the effect lasts three or four hours, but in a few cases the effect has ceased in twenty or thirty minutes. To avoid alarming people the less formidable names "gloovin" or "trinithin" may be used. When given by the stomach the effect is apparent in a few minutes, the pulse being increased from ten to twenty beats and becoming full and regular. In a few cases there is a slight headache, lasting for a few minutes.

In larger doses the face becomes flushed, a severe headache is experienced, accompanied with a feeling of fulness, singing in the ears, flashes before the eyes, and all the symptoms of an increased supply of blood to the brain. On account of this effect on the cerebral circulation, care should be taken in administering the remedy to the aged, as the sudden expansion of the cerebral vessels might cause a rupture of their weakened calcareous walls.

In case of a poisonous dose of nitroglycerine having been taken, we should select as antidotes such drugs as act in an opposite manner upon the vasomotor nerves. Our object should be to cause contraction of the arterioles. The most desirable agents for this purpose are strychnine, ergot, and atropine. These agents should be given subcutaneously.

In comparing alcohol, ether, and nitroglycerine we find that in all three there is, first, a period of excitement, when the heart beats quicker and fuller, and the brain, from increased supply of blood, is more active. In all three this first stage or effect is followed by a second effect, a stage of unconsciousness. With ether this first stage is soon reached and passed, and the second stage—that of unconsciousness—is rapidly entered. With alcohol the first period is of longer duration, larger quantities of the drug and a greater length of time being required to pass from the first stage into that of the second stage.

Nitroglycerine, compared to the rapidity of action of the other two drugs, enters the first stage almost instantly, and the stage of unconsciousness only after a poisonous dose is taken. Nitroglycerine should be preferred to alcohol in every case of emergency, because it acts with greater rapidity, can be given during unconsciousness, one drop is equal to an ounce of brandy, and it cannot create or arouse a slumbering appetite for the drug.

Cases are reported in full of the use of this remedy in angina pectoris, faintness during a minor surgical operation, rapid prostration in typhoid fever, in opium poisoning, in uræmic coma, in nephritis; benefit has been observed in chronic inflammation of the kidneys from the use of nitroglycerine. Its use is further suggested in persons apparently dead from drowning. In all such cases nitroglycerine would be of great benefit, heat to the body and the expansion of the chest not being neglected.—*Lancet*, June 22 and 29, 1889.

Mercurial Salts as Diuretics.

The use of large doses of calomel in cases of dropsy has attracted great attention, especially on the Continent, but the mode of treatment has not been much in vogue in England. The reason for this lies in the fact that calomel has to be administered in such large doses as to produce stomatitis, which must be treated by astringent gargles, and to cause diarrhœa, rendering opium necessary. It is, perhaps, a question whether such severe effects do not counterbalance the diminution of the dropsy. It is not to be denied, however, that in some cases, especially of cardiac dropsy, in which calomel is well borne, the mode of treatment is decidedly beneficial. Jendrássik stated that calomel was a diuretic only in œdematous conditions; but Biegarski has found that, if continued for a sufficient length of time in the healthy subject, it produces in from two to ten days distinct diuresis. This last observer has also investigated the action in the same direction of subcutaneous injections of corrosive sublimate and inunction of blue ointment. Both these produced

diuresis, the subcutaneous injections most powerfully, the inunctions least, whilst the internal administration of mercury might be considered as intermediate in power. Small doses had no diuretic action whatever; only medium and large doses increased the amount of urine.

The action was most marked in dropsy due to cardiac disease, and Biegarski asserts that the mode of treatment diminishes, and even cures pathological changes in the kidney. Mercurial salts, indeed, seem to act as diuretics by stimulating the kidney substance during their excretion in the urine.

Another observer, Shirtzig, confirms the above conclusions, especially as regards cardiac dropsy, in which disease digitalis may be combined with calomel. In dropsy due to kidney disease and to portal obstruction mercurial salts are of very little use.—*British Medical Journal*, June 22, 1889.

Cocaine Poisoning.

In the *Semaine Médicale*, Lépine has collected reports of many cases of poisoning by cocaine, given subcutaneously, in enemas, by injection into the urethra, after application to mucous membranes in the form of spray, etc., in which serious or fatal symptoms followed its use. In the way of treatment the inhalation of nitrite of amyl, to relieve the vaso-motor stimulation, is recommended; for severe convulsions, chloroform or chloral, opium has proved serviceable in many cases.

From these cases Lépine draws the conclusion that not more than three grains should be injected at once, and not more than six or seven grains should be brought in contact with a mucous surface.

It is well to exercise especial care in anæmic or in nervous patients, in whom cocaine poisoning is more easily brought about. To avoid anæmia of the brain, a horizontal position, or a preliminary inhalation of three drops of nitrite of amyl are suggested.—*Wiener klinische Wochenschrift*, June 27, 1889.

Eczema from Creolin.

On account of its having very little toxic action, Dr. Wackez used creolin as a dressing for wounds in children. Of seventeen cases, in which there were slight wounds, ten healed by first intention, while seven speedily developed a local eczema.

On the second day of treatment with creolin the vicinity of the wound was much reddened; on the third day, small and large blisters appeared. The temperature was increased, and the neighboring glands were enlarged, the patients suffered from anorexia, headache, and sometimes vomiting.

In order to decide whether these appearances were due to the creolin, or whether some of the other antiseptics might cause the same symptoms, an experiment was tried on a boy, six years old, who had fallen in the street, and had slight wounds on both hands. The abrasions of the right hand were treated with a creolin solution of 1 to 1000; those of the left hand with a 1 to 1000 of corrosive sublimate solution. On the third day an eczema appeared on the right hand; while on the left hand there was no trace of redness. The left hand was then treated with a three per cent. carbolic solution, while the creolin solution was continued on the right hand; on the next day the left

hand showed nothing out of the way, while the epidermis of the whole palm of the right hand was covered with blisters.

After opening the vesicles on the right hand the creolin was omitted, and the wounds were dressed with an ointment. The creolin solution was now applied to the left hand, and after three days ten small blisters appeared, which burst, and the epidermis came off about two days later.—*Therapeutisch. Monatshefte*, June, 1889.

Menthol and Saffrol in Neuralgias.

Menthol has a distinct use in relieving neuralgias of the fifth nerve and other local painful affections. Its local employment, either in stick or in plaster, is very popular. It is, in fact, a local anæsthetic, and, moreover, when applied in plaster, gives a comforting sensation of warmth to the painful part. Its action, so applied, is not, however, very powerful. Its internal administration has been advised by Dana for many painful affections. In doses of five to twenty grains it gives a pleasant feeling of warmth, while it stimulates the cardiac action, without increasing its rapidity, and raises the arterial blood-pressure. But the chief action noticed was that it relieved pain. It was found especially valuable in megrim, and in supraorbital neuralgia, and in the headaches of neurasthenic and anæmic patients. In some cases of sciatica relief was obtained; thus adding another drug to the multitude which may be used, often without effect, in this neurosis. Dana goes so far as to recommend menthol in preference to antipyrin in certain cases, in weakly and anæmic individuals, in whom the administration of antipyrin is not without danger, owing to its tendency to produce collapse.

Saffrol was also found to have the same effect as menthol. It is the liquid stearoptene of oil of sassafras, and may be given in headache and sciatica in doses of twenty drops.—*British Medical Journal*, June 22, 1889.

Glycerine as a Purgative.

Dr. Karl Ullmann contributes an exhaustive article on this subject, which can already boast of quite an extensive literature.

Mixed with water, glycerine enemata were often attended with failure in chronic constipation. A syringeful of pure glycerine (45 ♏) was administered, and the cases selected were those in which constipation had existed for at least two or three days, the maximum duration being twelve days. Two hundred and twenty-six enemata were given. The quantity of the dejections varied, in 31.4 per cent. the stools were copious, in 45.5 per cent. they were moderate in amount, and in 23.1 per cent. they were very scanty, containing merely the injected glycerine, mixed with some mucus and a brownish fluid. In 83 per cent. the stools were hard, consisting chiefly of scybala; in 13 per cent. they were fatty and unformed, and in 4 per cent. they were of a diarrhœic nature. Subsequent constipation occurred in 39 per cent. Diarrhœa followed in only 3 per cent. Painful sensations during the stool, or immediately afterward, such as burning in the rectum and colic, were complained of by only five patients, three of whom were suffering from acute parametritis and from retroversion of the uterus, one from chronic tubercular peritonitis.

Of the fifty-two cases in which the enemata failed, the author could find no

cause for the failure in the primary disease. In all, however, he was enabled to detect by palpation an atonic condition of the rectum, or an accumulation of the fecal mass higher up than usual.

Dr. Ullmann favors the theory that the local purgative action of glycerine is due to its power of abstracting water from the tissues, and in this way irritating the rectal mucous membrane, and causing contraction of the muscles of the rectum. Enemata of glycerine are servicable where, for any reason, a rapid evacuation of the lower part of the bowel is indicated. They are of no use when the accumulation of feces is in the upper part of the large bowel or in the small intestines. They are contraindicated in ulcerative conditions of the rectum, and in painful inflammatory affections of neighboring parts. In habitual constipation they cannot replace dietetic regimen, massage of the bowels, and well-known aperients. Further observations are necessary to determine whether their continued use is not injurious to the rectal mucous membrane.—*New York Medical Journal*, June 1, 1889.

Strophanthus as a Local Anæsthetic.

Many of the drugs which are useful in the treatment of cardiac disease also possess a local anæsthetic action. There is, of course, no connection, as far as can be seen at present, between the two actions. The local anæsthetic action of erythrophleine was investigated last year by many observers; the conclusions arrived at were that, although it possessed a powerful local anæsthetic action, it causes irritation and dilatation of the vessels of the conjunctiva, and in some cases even severe inflammation. It was thus much inferior to cocaine, whose action is accompanied by a constriction of vessels and consequent pallor of the part. Helleborin, the glucoside from the Christmas rose, is also a local anæsthetic and cardiac tonic.

The local anæsthetic action of strophanthus is, therefore, chiefly of pharmacological interest, like that of erythrophleine.—*British Medical Journal*, June 22, 1889.

MEDICINE.

UNDER THE CHARGE OF

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Gout; its Nature and Treatment.

In the *Medical Press and Circular* of June 5, 1889, is an abstract of recent papers by Ebstein and by Pfeiffer on this subject. Ebstein divides gout into two great classes: 1st. Those of joint affections. 2d. Those attacking the

kidneys. The first form is the typical form of gout, where the joints and their surroundings become affected by the morbid process. The attack usually comes on by night, and the favored seasons of its approach are the spring-time and the end of the autumn season. After localizing it in the great toe, he said accumulations of gouty matter were to be observed in young people afflicted with the disease. These enlargements are closely connected with the uric acid found in gout. Ebstein is opposed to the opinion held by Garrod regarding these enlargements—*i. e.*, that they are caused by an excess of uric acid in the blood, which, in the form of sodic salt, becomes deposited in the tissues of the joint, and by this gradual accumulation and final irritation produces the gouty inflammation commonly accompanying this affection. He considers this deposit of the urate of soda to be the result of the inflammation, and not the cause, as Garrod believes it to be. He next referred to the effect of the gout on the nervous system, through which he considers the heart and bloodvessels become affected. He is quite satisfied that gout is hereditary in families, but that it does not confine itself to the indolent and high-fed, but rather afflicts the active and moderate liver and the industrious class. In females the attacks are not so intense as in males. Men suffering from gouty affections may reach a good old age, though the diathesis is fraught with much danger to life.

PFEIFFER holds the view that uric acid is diffused through the fluid tissues of the body in a very insoluble form, which soon becomes deposited throughout the body, or is localized in the form of swellings. The earliest effects are the retention of uric acid, which rapidly accumulates in the system until every organ becomes more or less affected; or, if it happens to expend its force on a single organ, death may be the result.

The first indication, therefore, in the treatment would be the excretion of a proper amount of urea and uric acid in the urine, since their retention soon produces a low cachectic condition of the system. After this, the administration of a salt that will convert the insoluble substance into a soluble substance allowing of rapid elimination, soon relieves the pain and reduces the swelling. The first important step is to correct the diet. This should consist largely of albuminous matter, as beef, eggs, etc., as well as fat and green vegetables; but fermented drinks, starch, and sugar should be forbidden. The use of a meat diet is very important, as the retention of the urea and uric acid quickly produces a cachectic condition of the system which must be early combated in the treatment, but the meat diet does more than supply this necessity, for the salts of the meat, when taken into the system, have a solvent influence that speedily raises the elimination of urea and uric acid to even more than the normal quantity. The same may be said of all proteid substances, and more particularly of eggs. Sour milk and cheese should be avoided, but fruit and salads are beneficial, as they alkalize the alimentary canal, while wine and beer have the opposite effect, and should be strictly prohibited.

The medicinal treatment should consist in the administration of some alkaline salts, and the carbon salts seem to be the best, though phosphoric acid and boracic acid have in some cases proved beneficial. Hydrochloric acid and sulphuric acid are objectionable. All alkaline and mineral waters should be given in small doses to begin with, and gradually increased. The mineral

water of Fachingen is the most efficacious, although those of Kaiser Friedrichquelle, of Offenbach, are to be commended. The author knows of nothing that could surpass the mineral baths of Wiesbaden in the treatment of gout. One week with a thermal bath of 28° Reaumur daily will restore to health the most gouty patient, and a prolongation of the treatment will soon dissolve any old chronic swellings that might happen to be present. In very rapid and acute cases he thinks the best good can be obtained by the free use of salicylate of soda.

The Movements of the Thorax and Lungs considered in their Relation to Certain Pulmonary Diseases.

J. W. Roosevelt (*Medical Record*, May 25, 1889, p. 566) says that no satisfactory reason has been given for the frequent selection of the upper lobes of the lungs by the tubercle bacilli, and of the lower lobes by the pneumococci. It is difficult to imagine a selective action of air-currents, which drives one up and the other down in the air-passages. Believing the study of the chest-movements of great importance in this connection, he made a series of observations on professional models. The first point noted was that the sternum moves but little, particularly in an antero-posterior direction. The upper part seems to advance more than the lower; and in deep inspiration the bone seems to bend at the junction of the gladiolus and manubrium. The greatest motion of the chest is the expansion at the sides in the neigborhood of the anterior axillary line. The motion of the ribs is not about two axes, as is usually described; and, indeed, this double movement is rendered almost impossible by the anatomy of the parts. Experiments upon the cadaver and upon animals have shown him that revolution around a single axis will explain nearly all the movements of a rib—this axis being a line drawn from the tubercle to the middle of the articulation with the vertebral body. Such a line runs from within somewhat outward, from before backward, and from above downward.

Regarding the degree to which the lungs are moved by the ribs, it is evident that it is important to determine, not whether the upper lobes are actually moved less, but whether the expansion is less in proportion to their bulk. If there were any difference in the expansion of the lobes, it would be expected that with the thoracic breathing of females the upper lobes of this sex would be less often affected with tuberculosis than in the case of males; but experience teaches that this is not the case. It is easy to see that it is along the attachment of the ligamentum latum and along the vertebral column that the lungs must actually (not relatively) expand the least, yet the evil effects of deficient expansion in the shape of tubercle are not often seen here. In fact, it cannot be shown that any part of the lung receives less in respiration in proportion to its bulk than does any other part.

The author shows that it is impossible for the upper lobes to be expanded in coughing or any act of forced expiration by air driven into them from the lower lobes. Theories which have been advanced with regard to assumed peculiarities of respiration in the upper lobes would apply as well to the distribution of one form of bacterium as to another, and the same is true of fine dust. He claims, therefore, that no explanation exists of the frequent selection of any lobe by any inhaled bacterium.

The Bromide Treatment of Epilepsy.

Gauster (*Wien. med. Presse*, 1889, xxx. 609) details three cases of epilepsy, which he selects out of a large experience, because their treatment extended over a long period of time. He concludes his article as follows:

1. The bromide treatment is at present certainly still the best in epilepsy of different sorts, especially in the idiopathic form.

2. As a rule, however, it must be continued for years. The size of the dose is to be determined in each case by careful trial and observation, both as to the amount which may be given during the activity of the disease, and as to the dose which shall be continued during years after the improvement of the patient.

3. Under a careful observation of the patient's condition, even as much as twenty grammes daily may be administered for a considerable time without injury.

4. The increasing of the dose should be stopped, or the amount should be diminished until it is temporarily or permanently replaced by some other drug:

(*a*) If severe digestive disturbances appear, so that the nourishment of the patient appears to be endangered in a high degree.

(*b*) If very evident and persistent catarrh with slight dulness develops at the apices of the lungs.

(*c*) If deep ulceration of the skin, or marked aggravation of previously existing chronic cutaneous disease appear.

5. Diminution of the intellectual power during the bromide treatment is, as a rule, no sufficient reason to abandon the treatment or materially diminish the dose.

6. Pulmonary tuberculosis, severe chronic cutaneous diseases with a tendency to ulceration, and marked disturbances of nutrition are contraindications to the bromide treatment, unless the mastery of the paroxysms be a question of saving life or of holding in check a severe psychosis.

7. Moderate emaciation is no contraindication, since the weight can be gradually made to increase during the use of the bromides, by administering suitable nourishment.

8. During the bromide treatment particular care must be taken that a large amount of food be ingested; and at not too long intervals examination of the lungs and of the skin should be made.

The Therapeutics of Pneumonia.

Cantani (quoted in *Centralbl. f. d. ges. Therap.*, May, 1889) contributes a useful article on this subject. In cases running a regular course the expectant treatment is the best. The less the physician does, the greater the probability of recovery. Sometimes certain symptoms demand special treatment. When an unusually tenacious secretion occludes the smaller bronchioles, and prevents the air from entering the alveoli, it is necessary to make this more fluid. This can be done by the use of bicarbonate of soda, chloride of ammonium, iodide of soda, or senega. If expectoration is rendered difficult by threatening paralysis of the bronchial muscles, small doses of ipecacuanha are indicated, combined with a stimulant, as alcohol, ammonia, etc. In impending

œdema of the lung ipecacuanha in emetic dose is to be avoided on account of its depressing action on the heart. The act of vomiting itself may prove injurious in conditions of adynamia. If there is danger of œdema of the lung and the pulse is strong, it would be better to induce vomiting by irritating the palate, or by giving apomorphine.

Cardiac weakness demands attention. If this condition be the expression of marasmus, or of anatomical changes in the heart, all therapy is useless. If, however, it be due to exhaustion of the right heart from extensive infiltration of the lungs, the energy of the heart must be increased, best through alcohol or strophanthus. Digitalis is not to be recommended; and the author is opposed to the administration of alcohol at the commencement of every case of pneumonia, lest the myocardium be exhausted thereby. In the event of purulent infiltration such balsamic drugs as turpentine are useful, given both internally and by inhalation. In venous congestion of the brain, with somnolence, sopor, and cyanosis, leeches to the nose and under the eyes are of service.

The author is opposed to antiphlogistic and antipyretic procedures in pneumonia, except only that excessive high temperature be combated. The chief use of the cold bath is to increase expectoration when this cannot be accomplished in any other way. Warm moist applications to the breast he prefers to cold. He does not recommend the modern antipyretics, on the ground that they depress the heart as well as the temperature, and frequently cause collape. Venesection is to be abandoned except in threatening suffocation from pulmonary œdema in robust individuals, and when the heart is sufficiently powerful vesicants and sinapisms.

Treatment of Pulmonary Tuberculosis with Guaiacol and Creasote.

Bourget (*Correspondenz-Blatt f. Schweitz Aerzte*, 298, May 15, 1889) says that of all the remedies recommended for the treatment of phthisis, beechwood creasote is the only one which retains its ascendency, although some pessimistic physicians still reject absolutely all treatment as useless. It is evident that not much is to be attained when creasote is given in doses of only two to three drops a day, but it is otherwise when larger amounts are administered. It is necessary to make the patient take the largest dose possible, without reference to what the Pharmacopœia says on the subject, only seeing that the digestive system is not seriously disturbed thereby.

Guttmann has shown that tubercle bacilli will not grow in solutions of a strength of 1 : 2000 creasote, while cultures are but feeble in a concentration of 1 : 4000. To charge the blood in the proportion of 1 : 4000 would require the ingestion of 15 grains of the drug daily, an amount which this writer did not find it possible to give, though he administered 9 grains. Sommerbrodt has given 12 grains daily inclosed in capsules. This plan Bourget condemns on the ground that the drug thus administered will produce a very active circumscribed inflammation at the point where the capsule empties its contents. Pills of creasote made up with some resin, in the usual manner, are equally objectionable, since his experience confirms that of Goetz and Gilbert, that they very generally pass through the intestine undissolved.

For about three years he has used with very satisfactory results a method of internal and external treatment which he calls the "intensive method," and which consists in saturating the system with creasote without inconveniencing the patient. For the internal treatment he prefers guaiacol dissolved in wine, or, in winter time, in cod-liver oil. The wine is given in tablespoonful doses, each of which contains about one grain of guaiacol. Little by little this is increased to 2–3 tablespoonfuls, until many patients are able to take 15 grains of guaiacol daily. In cases in which there is a disgust for the wine or it disagrees with the stomach, the author administers the drug by enema, in the form of an emulsion. The two forms of administration can sometimes be alternated with advantage, giving the drug by the mouth for twenty-five days, and then by the rectum for an equal time.

At the same time the author employs externally a mixture of 20 parts of creasote and 200 parts of cod-liver oil. On retiring, the patient's chest, back, and axillæ are rubbed with this. During the night, and when possible during the day also, an inhaler is worn, in which a few drops of creasote are placed.

Gradually the patient is, in this way, saturated with creasote in an amount sufficient to interfere considerably with the evolution of the bacilli. To obtain success the treatment must be continued without intermission for three to four months.

An Unusual Anomaly of the Pulmonary Valve.

Stintzing (*Deutsch. Arch. f. kl. Med.*, B. xliv. 149) describes, with an illustration, an interesting case of pulmonary insufficiency, the valve possessing only two leaflets. The patient was a woman of sixty-four years, who had always worked hard, had suffered several severe attacks of illness, and had borne six children. She had inflammation of the lungs eight months before, since which time she had experienced shortness of breath, cough, and pain in the side, head, and feet. More recently she had suffered from frequent attacks of palpitation and dizziness. When examined she exhibited cyanosis, constant cough, and a few rhonchi in the lungs. The apex-beat of the heart was diffuse; the cardiac dulness reached considerably beyond the right border of the sternum. There was diastolic murmur, whose point of maximum intensity was at the third and fourth cartilages on the left side. At the corresponding point at the right border of the sternum the murmur was fainter, and a dull but clear second sound could be heard.

The patient's condition grew worse, the apex-beat became weaker, albumin appeared in the urine. A very sharp post-systolic murmur could be heard at the left border of the sternum. At the origin of the aorta both sounds were dull but clear.

The autopsy revealed hypertrophy and dilatation of the right ventricle, some degree of emphysema of both lungs, and a defective formation with insufficiency of the pulmonary valve. Two of the leaflets, namely, were of normal appearance, while between them was an apparently rudimentary leaflet, leaving a triangular opening. The leaflet, which the author describes in detail, was smooth and covered by endothelium.

The author discusses the few reported cases, which in any respect have

resembled his, and then endeavors to determine the mode of origin of this anomaly. He concludes that it is extremely improbable that the defect was due to endocarditis, which could hardly have been limited to *one* leaflet and have left it perfectly smooth and thin. It is also quite certain that the cause was not atheroma. The condition must have been congenital, though against this supposition is the fact that the patient had lived so long without cardiac symptoms, and with a disease which usually so soon makes its presence known. He believes this may be explained on the supposition that the insufficiency only became a matter of importance in later years with the widening of the lumen of the vessel. The emphysema or the inflammation of the lungs could have been the cause of the increased pressure which produced the widening of the pulmonary artery.

From a clinical point of view the case is also instructive, as showing the difficulty of distinguishing between this condition and insufficiency of the aortic valve. During life the case had been diagnosticated as the latter affection, and the author reviews the reasons justifying this diagnosis.

He concludes that pulmonary insufficiency can only be recognized, 1st, when the hypertrophy or dilatation of the right ventricle can by physical examination be distinguished from a like condition of the left ventricle (the diagnosis of this condition resting on the enlargement of the cardiac outline, especially toward the right with the apex beat felt more distinctly in this direction, and the presence of strong epigastric pulsation); 2d, when the pulse, in a state of good compensation, does not exhibit the characteristic quality of that of aortic insufficiency.

The Cause of Anæmic Heart-murmurs.

At the close of a long discussion of this subject Sehrwald (*Deutsch. med. Wochenschr.*, No. 21, 1889) draws conclusions, which may be summed up as follows:

1. In defining anæmic heart-murmurs the principal feature is that the heart is completely intact. All those attempts at explanation are therefore to be abandoned which resort to any secondary anatomical cardiac alteration.

2. So also, theories are untenable which explain some of the peculiarities of these murmurs, but leave others unexplained.

3. As none of the numerous hypotheses fulfil both of these conditions, a new one must be sought which rests solely on the existence of anæmia, and at the same time accords with clinical observations.

4. Of the many murmurs arising in the circulatory apparatus, only the venous hum can be considered analogous to the anæmic heart-murmur, since only this is due in like manner, and exclusively, to an under-filling of part or the whole of the vascular system with blood.

5. Venous murmurs are produced as soon as the lumen of the jugular vein becomes so narrow, on account of the imperfect distention, that the bulbus acts only as a sudden dilatation in which consequently the fluid makes eddies and noises. The anæmic heart-murmurs arise through an imperfect filling, and consequent narrowing, of the great veins emptying into the heart. The small quantity of blood contained in them pouring into the wide-open auricle, produces here also eddies and noises.

6. Since the bulbus venis jugularis is kept permanently open by the cervical fascia, the venous hum is continuous. The auricle, on the other hand, is only open during its diastole, and its murmurs are therefore intermittent.

7. The reëxpanding of the relaxed auricle is brought about by the influx of venous blood, the negative thoracic pressure, the displacement of the atrio-ventricular septum by the ventricular systole, and the simultaneous contraction of the great veins over-distended during the auricular systole. Only the last three factors have any influence in producing an active dilatation, by which the auricle exerts a sucking action on the venous blood.

8. The diastole of the auricle begins with the commencement of the ventricular systole. It is only at this moment that the three factors alluded to act together on the auricle, and at this time, therefore, the auricular aspiration and the production of the eddies and murmurs must be the strongest. Usually, indeed, the murmurs are only heard at the beginning of the systole. Later, during the ventricular systole, only the negative thoracic pressure is acting on the auricle.

9. The conditions for the development of a murmur are much more favorable in the left ventricle than in the right, because on the left side the pressure of the veins is greater, the retraction of the atrio-ventricular septum is more marked, and, especially, the veins are of much narrower lumen than on the right side. Anæmic murmurs must accordingly predominate in the left auricle.

10. Eddy-murmurs in the left ventricle (including such as are regularly formed in mitral insufficiency) are best heard over the position of the auricle in the second left intercostal space; or over the ventricle down to the seat of the apex. The predominant occurrence of anæmic murmurs in the pulmonary and mitral areas agrees with this statement.

11. The development of anæmic murmurs in anæmia, cachexia, fever, etc., and the modification of the murmurs under different conditions may all be satisfactorily explained by the two factors;—altered degree of fulness of the pulmonary veins and change in the aspiratory power of the left auricle.

12. Anæmic murmurs in the right auricle develop with much greater difficulty, and are to be heard under the upper and middle third of the sternum. Clinically they occur very seldom.

The rare *diastolic* anæmic murmur is to be heard over the course of the superior cava, and must be considered a diastolic accentuated portion of a jugular venous hum.

Diphtheritic Gastritis or Gastric Diphtheria.

Talfourd Jones (*Brit. Med. Journ.*, 1889, ii. 880) reports a case of this very rare affection. The patient, a child of two years and ten months, developed difficulty in swallowing on the third day of the disease; on the sixth, she vomited several times; on the seventh, there was difficulty in breathing and frequent vomiting, the ejecta consisting of a little blood and some dark red pieces of a membranous character. Death occurred on the following day. The autopsy revealed a widespread membranous exudation of the pharynx and adjacent parts, the posterior nares, and the larynx down to the cricoid cartilage, where it abruptly ceased. The œsophagus was quite normal in every respect. The stomach had a soft, doughy consistence, and, when

opened presented an irregular, dark, reddish-brown appearance with a slightly olive-green tint. This was found to be the surface of a continuous membrane lining the whole of the stomach. It varied in thickness, averaging one-twelfth of an inch, but being thickest over the rugæ. It was adherent to the mucous membrane, but was easily separated and peeled off, and then exhibited on its under surface the imprint of the markings of the mucous membrane. Except in thickness and in its dark red color it differed little from the exudation in the pharynx.

The rugæ of the mucous membrane were of a black-red hue and studded with a dark red punctiform injection. The mucous lining between the rugæ was of a much lighter color. The intestines were healthy.

Under the microscope the exudation from the stomach presented an irregular fibrillated appearance with numerous red blood-cells and leucocytes.

Studies on the Functions of the Stomach in Phthisis.

F. Schetty (*Deutsch. Archiv*, Bd. xliv. 219) says that as all the investigations carried on have as yet failed to give us any specific against tuberculosis, we are obliged to combat the disease in some other way, *i. e.*, by strengthening the organism and making it as resistant as possible to the action of the poison. The dietetic and the climatic treatment are therefore to be considered, and of these the most important is the former, since the latter cannot so often be carried out. As the affection is essentially a wasting disease the dietetic treatment is greatly to be desired, but unfortunately often meets with the greatest obstacles in the form of gastric disturbances. The author quotes extensively from well-known writers regarding the digestive disturbances of phthisis, but says that no satisfactory explanation of the cause of this is offered. The fact that *gavage*, as practised by the French clinicians, is often of great advantage to the patient is an indication that in spite of the patient's dislike for food, there is no abnormality of the digestive capacity of the stomach. He cites the meagre investigations which have been conducted regarding the gastric function in phthisis, and then details the studies which he has made on twenty-five cases of the disease. He choose both incipient and more advanced cases; those with but little fever, and those with marked pyrexia. He first examined the patient according to the method of Kahn and von Mering, viz., in the morning, on an empty stomach, the patient received two hard-boiled eggs and one hundred to one hundred and fifty grammes of water. After an hour the gastric contents were carefully removed by aspiration with a soft tube, filtered, and examined. The examination consisted in determining: 1. The reaction. 2. The presence of lactic acid by the use of the carbolated-iron test. 3. The presence of free hydrochloric acid by the same reagent, as well as by Congo-paper, *vert brillant*, tropäolin, methyl-violet, and phloroglucin-vanillin (the last of which tests he considers the best). 4. The presence of acetic and butyric acids; tested by the odor. If it was determined that only inconsiderable quantities of lactic, acetic, and butyric acids were present, the amount of free hydrochloric acid was determined quantitatively by titration with one-tenth normal sodium solution. The peptic strength of fifteen cubic centimetres of the filtrate was

then tried on a piece of boiled egg albumen, one millimetre thick and six millimetres in diameter, and the time required for digestion determined.

Within two to three days a second examination was carried out, after the method of Leube; the patient receiving a mid-day meal of soup, beefsteak, bread, and water; and the contents of the stomach being removed after six hours, and tested in the way already described.

The results of his investigations were as follows:

1. The production of hydrochloric acid was in all the cases not diminished in the morning, and in some of them even increased. There was a normal production of acid both in the advanced cases and in those with morning fever.

2. The digestive power of the gastric contents was destroyed in no case; the length of time required in the digestion test was one to two hours, and corresponded to the normal condition.

3. The time required for digestion within the stomach in the afternoon and evening hours was not prolonged, and there existed consequently no motor insufficiency in the cases examined; for in all but three of the cases the stomach was empty after six hours, and in these there was no food remaining, but only some of the gastric secretion. The degree of advancement of the disease, or the elevation of the body-temperature, appeared to have no influence.

It seems certain, then, that the so-called gastric disturbances of many phthisical patients do not always depend on gastric catarrh and a diminution of the secretions. It is of importance, therefore, to make in every case possible an examination of the secretion, in order to be able to determine the most suitable therapy. Cases in which the secretion is found normal are often suitable subjects for *gavage*, and will be benefited by it.

The Relation of Bacteria to the Diarrhœal Diseases of Infancy.

L. E. Holt (*New York Medical Journal*, April 13, 1889) says that in a study of the effects of microörganisms upon the human body, and especially in diarrhœal diseases, three factors must be kept in mind:

1. The nature of the microörganisms. 2. The dose or numbers in which they enter the body. 3. The vulnerability of the patient.

He then takes up the consideration of the normal conditions present in infants on milk diet, concluding:

1. That the small intestine is acid throughout the upper two-thirds of its course.

2. The source of the acid is the decomposition of the milk-sugar which is present here, though not in large amount.

3. There is no decomposition of casein.

4. All the casein and the greater part of the milk-sugar appear to be absorbed soon after they enter the intestine.

5. Oxygen is absent, with the possible exception of a very small amount next the mucous membrane.

6. But two varieties of bacteria have been constantly found: The *Bacterium lactis aërogenes*, which decomposes milk-sugar principally into lactic acid, and which is found chiefly in the upper part of the small intestine; and the *Bacterium coli commune*, occurring in great numbers in the colon and stools.

That so few varieties are normally present is due to the exclusive diet, the absence of oxygen, and the rapid absorption of both casein and milk-sugar, and not to any action of bile, which is not an intestinal antiseptic.

The normal conditions described may be altered in several ways. Thus, first, bacteria foreign to the intestine may develop, either because there is a failure of digestion and a consequent increase of the amount of unabsorbed material in the intestine; or because the quantity of food given, though of normal character, is too large for the intestine to manage; or because food so improper is given that it is but slightly or not at all acted on. In the second place there may enter with the food pathogenic germs, whose effects will depend on their nature, the number which enter, and especially on whether or not the digestive organs are in a healthy condition. In the third place, poisonous ptomaines may be formed in the food outside of the body, and develop toxic symptoms on being ingested.

Abnormal bacterial growth in the intestine results in the production of a catarrhal inflammation, often very slight for some days, but resulting in the secretion of serum and mucus, and probably in the formation of oxygen; these new conditions in turn tending to greatly increased activity of the bacterial growth with the production of a severe type of the disease. Another injurious effect of the bacteria is that they set up decomposition of food in the stomach and intestines, or increased peristalsis with hurrying along of the food, so that the patient suffers from innutrition. Toxic symptoms are also produced from the absorption of ptomaines.

That children over two years so usually escape is probably because after this time the intestine is very little vulnerable to bacterial attack. Breast-fed children escape because their digestive organs are in a healthier condition and their food free from germs. Hand-fed children suffer most because they are almost always overfed, very many suffer much of the time from a mild form of catarrh, and their food in summer contains germs in abundance.

Prophylaxis is a matter of the greatest import. Germs are to be excluded by sterilizing milk and by absolute cleanliness. The air, too, should be as free from germs as possible; and care should be taken that the mouth is clean. Healthy digestion and absorption must be obtained by building up the infant's constitution, giving proper food at proper times and in proper quantities. During the summer the amount of nourishment should be materially reduced.

Treatment consists in, 1, nourishing the patient; 2, combating the abnormal bacterial growth; 3, treating the lesions. All these indications must be met, but early in the disease the second may be the most important, while later the third is of more prominence.

Olive Oil in Cholelithiasis.

To this, at present much discussed question, Rosenberg (*Fortschritte der Medicin*, No. 13, 1889) adds the observation that experiments on dogs show that ingestion of large doses of olive oil increase the quantity, while they diminish the consistency of the bile excreted, thus attaining the ideal conditions aimed at in treatment. The experiments were made on dogs with gall-bladder fistulas. It will be noted that these observations are directly opposed to those of other investigators recently recorded in these pages. Other communications will doubtless follow.

SURGERY.

UNDER THE CHARGE OF

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Etiology of Suppuration.

To this much-disputed question Nathan (*Archiv für klin. Chirurg.*, Bd. xxxvii. S. 875–879) makes a contribution of great interest in view of the fact that Grawitz and De Bary assert that ammonia, silver nitrate, and turpentine injected subcutaneously into the tissues of dogs produce a suppuration in which no germs can be found.

Nathan used dogs in his experiments; the point of injection was shaved and carefully disinfected by corrosive sublimate solution, 1 : 1000; the substance used was, after careful sterilization, injected by means of a needle thoroughly purified by heat. During the whole experiment the field of operation was irrigated with sublimate solution. It was found that abscesses did at times, but not invariably, appear as a result of these injections. Plate cultures invariably showed that these abscesses contained microörganisms, though both cover-glass preparations and test-tube cultures failed to demonstrate them. The development of microörganisms was explained by the theory that by constant licking the dogs infected the needle puncture.

Trephining for Brain Tumor.

The following case is reported by Fischer (*Wien. medizin. Presse*, No. 25, 1889). Patient, æt. thirty-seven, suffered in 1887 from the first symptoms of brain tumor. There was an epileptic attack with subsequent monobrachial paresis and disturbance of sensibility. On examination some aphasia was detected, together with sluggishness of the left pupil. The patient was trephined, but no trace of cerebral tumor could be found; nevertheless, there was great improvement in all the symptoms, which was, however, only temporary. Five months later, at the earnest solicitation of the patient, he was again trephined and a tumor was found involving the ascending frontal convolution. This was shelled out by the finger of the operator, and the cavity was tamponed with iodoform. There was prompt healing. Two months later the symptoms of cephalalgia and paresis returned, and the patient died in coma. The recidivity had taken place not from the brain substance, but from a portion of the growth which had not been removed from the dura. The tumor was a round-celled sarcoma.

In view of the uncertainty of diagnosis and the relief which in certain cases operation can afford to the patient, Horsley advises, in all instances, an exploratory opening of the cranium. In Jacksonian epilepsy this is also to be commended, while even in idiopathic epilepsy the segment of the skull

from which the trouble seems to originate has been removed with a subsequent amelioration of all symptoms.

Cervical Aërocele.

Petit (*Revue de Chirurgie*, No. 6, 1889) considers briefly, but very thoroughly, the etiology, symptomatology, and treatment of what are variously called aëroceles, bronchoceles, laryngoceles, and tracheoceles. Some forty-two cases are reported, and the author decidedly takes issue with Gayet's dictum, "The surgical treatment is worse than the disease." In regard to prognosis, these affections are arranged as follows:

1. Aëroceles caused suddenly by effort, as in case of a cough or during labor. In these cases, since the cause is mostly temporary, the disease may readily effect its own cure.

2. Aëroceles produced suddenly by great and repeated muscular effort, as in case of chronic chest affections accompanied by violent cough. In these cases there is no tendency to cure. Compression may arrest but cannot cure the affection.

3. Aëroceles due to ulceration or lesion of the air-passages. Some are cured when the original lesion is repaired, others have little tendency toward recovery.

In certain cases the prognosis of aërocele may be exceedingly grave, quite independently of the causative lesion or defect. There are, in these cases, sudden and repeated attacks of dyspnœa, due probably to pressure upon the recurrent laryngeal nerve.

The treatment consists in remedying the primitive and causative defect, in combating the pressure effects of the tumor, preventing its growth, endeavoring to cure it, and providing against its recurrence.

As far as operative procedure is concerned, an incision should first be made which gives sufficient room for thorough exploration; the tumor should then be opened and the orifice of communication found. This should be carefully closed, its surfaces having been first freshened, the walls of the cavity should be dissected out, and the whole wound should be tightly approximated by deep and superficial sutures.

Petit's conclusions are:

1. The predisposing causes for gaseous tumors of the neck are the anatomy of the parts, anomalies of this region, pathological conditions, and traumatisms.

2. The exciting cause is usually muscular action.

3. These tumors exist either as a hernia of the mucous membrane, or simply as a space or cavity in the cellular tissue of the neck. They are, consequently, either without lining walls, properly speaking, or are circumscribed by a mucous membrane, or a structure resembling that which circumscribes cysts.

4. Clinically regarded, these tumors either develop immediately to full size, or after sudden appearance slowly enlarge, or grow steadily from their first appearance.

5. These tumors can be cured by compression and the administration of narcotics, or, that failing, by operation.

6. Tracheotomy is indicated where there are attacks of sudden, violent, and dangerous dyspnœa.

Resection of the Liver.

Boggi (*Wiener med. Presse*, No. 21, 1889) has been successful in resecting a portion of the liver. The history of the case is as follows: A woman entered the hospital with a tumor in the right hypochondriac region. Loops of intestine overlay the tumor. A double echinococcus cyst was diagnosticated. On operating, two enormous echinococcus sacs were found, the one placed superficially in front, the other lying deep and behind. The tumors, which weighed three pounds, were enucleated. Since approximation of the edges of the huge wound was not possible, a portion of the liver parenchyma three inches long was resected. The bleeding was stopped by catgut sutures. The edges of the cavity in the liver were secured in the belly wound. On account of the escape of gall from the liver the dressings required frequent changing at first. This secretion gradually disappeared and healing was quickly accomplished. A microscopic examination of the resected portion of liver showed that the lumina of the bile canals in the region of the cysts were patulous. This demonstrates the risk of leaving the fresh liver surfaces, after excision of the cyst, free in the peritoneal cavity. As was done in this case, the edges of the liver wound should be secured in the opening of the abdominal parietes.

Ceccherelli observes that, according to experiments upon animals, only a certain amount of liver substance can be removed. If more than one-third is resected, life can no longer be preserved.

Postemski has found that the peritoneal cavity of a dog withstands a certain amount of gall, but if the flow is continued a fatal non-septic peritonitis is set up.

In regard to the question of hemorrhage from the liver, Babacci strongly insists upon careful approximation of the bleeding surfaces. Experiments have shown that while the thermo-cautery is efficient when the livers of small animals are wounded, it is by no means to be relied upon in the case of larger animals. The approximation of fresh liver surfaces after excision of a portion of the organ is best accomplished by the elastic suture which has been soaked in five per cent. carbolic solution. This suture supports the parts very satisfactorily, completely fills the needle punctures, and is especially valuable in this location because the liver is constantly subject to changes in volume.

Suture of the Intestines.

Two interesting cases of intestinal suture are recorded by Albserg (*Deutsch. med. Woch.*, No. 26, 1889). In the first case a decrepit woman, aged seventy-four, inflicted a razor wound upon herself. She was brought to the hospital one hour later, perfectly conscious, exhibiting no signs of shock, but with a weak and irregular pulse. In the upper part of the belly was a penetrating wound eight inches long, running parallel to the right costal arch and about an inch below it. From the wound protruded the omentum and a large mass of intestines, one loop of which was cut transversely through two-thirds of its circumference. This wound was placed in the cæcum, just opposite the ileo-

cæcal valve. The belly walls and surrounding parts were only slightly soiled by feces. After careful disinfection the bowel wound was closed by the customary silk double suture, the first series being interrupted, the second continuous. An inch below the first wound a second was found, so small that it allowed only a slight prolapse of the mucous membrane; this was also closed by a double line of sutures. That the peritoneal cavity might be thoroughly explored, the original wound was enlarged by a longitudinal incision extending to Poupart's ligament. No trace of feculent extravasation was found. On the under surface of the liver there was a small, oblique, actively bleeding wound, the hemorrhage from which was controlled by ligature. Bowel and omentum were then replaced, and the parietal opening sutured. Dressing: iodoform gauze and moss pillow. Flatus after thirty-six hours; spontaneous defecation on the fourth day. Twenty-five days later death. Abdominal cavity aseptic; seat of bowel suture so absolutely healed that it could scarcely be found. Exitus due to heart failure.

In the next case the gut was sutured after resection of a cancer of the descending colon. The patient, aged twenty-nine years, gave a history of perfect health up to fourteen days before, when he fell upon his left hip. Dry tongue, fever. Directly over the left anterior superior spinous process of the ilium a red, tender, fluctuating swelling, the size of a man's fist. Acute osteomyelitis and periostitis were diagnosticated, and the abscess was evacuated by a free incision. On careful exploration roughened bone could be felt. All symptoms of septic absorption disappeared, and the patient was sent home with a small fistula, the healing of which he was told would necessitate another operation. A month later he returned for this operation. The fistula discharged only a small quantity of thin pus. A most striking fact was that the iliac swelling had not decreased; on the contrary, there was a progressive growth in a backward direction toward the region of the kidney. This circumstance at once suggested a neoplasm, the existence of which was confirmed by exploration through the first incision. Extirpation was decided upon. The mass was readily freed from the ilium, when it was found to involve the descending colon. The gut was ligated above and below the tumor, and the latter was extirpated, together with some enlarged glands of the mesocolon. The free ends of the cut bowel were immediately approximated by circular sutures of silk placed in three rows. The peritoneal cavity was carefully disinfected, and, after partial closure of the parietal opening, the seat of intestinal suture was secured in the wound by a strip of iodoform gauze passed around the bowel. The parietal wound was tamponaded and the dressing was completed by iodoform gauze and a moss pillow. No fever, no sign of peritonitis; flatus the second day; abundant passage of feces on the sixth day. Second change of dressing on the fifth day, when the strip of gauze holding the gut in the wound was removed. On the eighth day feces discharged into the wound, through a small perforation four-fifths of an inch above the suture line. This perforation rapidly increased in size, so that a præternatural anus was formed in a few weeks. At the same time there was some recidivity of the malignant growth along the tract of the former fistula. This was carefully removed, together with a portion of the ileum which was involved. The edges of the bowel perforation were freshened and approximated by silk sutures, which held for ten days, after which perforation again occurred and

nearly all the feces were passed through the abdominal opening. A month later the bowel was freed as much as possible, and the edges of the opening united transversely, after which the whole wound was covered in by a flap transplanted from the anterior abdominal wall. In two days some feces were found in the dressing, in spite of which nearly the whole flap healed by primary intention. Shortly feces were passed abundantly through the fistula, but soon this discharge began to diminish, till the patient required cleansing but twice a day, and passed naturally a large evacuation every morning.

Lately there has practically been no feculent discharge from the fistula, only a small quantity of pus appearing on the dressing. About seven inches of gut were resected together with the tumor, which was shown, by microscopic examination, to be a cylindrical-celled epithelioma.

The perforation after the first operation was, in this case, due to the sharp bending of the gut caused by fastening it in the wound by the strip of gauze placed about it. This flexure checked the passage of feces, and this produced sufficient interference with nutrition to determine an ulceration of the bowel. It might be safe in these cases to sink the line of suture into the peritoneal cavity.

Extirpation of the Cæcum.

Durante (*Wiener med. Presse*, No. 21, 1889) reports a successful case of extirpation of the cæcum; being the third of its kind on record.

The patient, æt. fifty-six, suffered for twelve years from attacks of colic and vomiting. In the last year she experienced such extreme pain that she demanded relief at the hands of the surgeon. In the lower right side of the belly there was a slightly movable tumor, the size and form of a large citron, irregular in surface, and apparently dense and indurated. It was diagnosticated as a carcinoma of the cæcum or of the surrounding parts.

The operation was most difficult, because of the multiple adhesions which had formed between the peritoneum, intestines, and tumor; the latter was finally extirpated, however, together with the cæcum to which it was attached, and the continuity of the gut was restored by suturing. There was no fever. The first passage by the bowels occurred seven days after the operation, and on the tenth day the patient was up and about. Section through the tumor showed that it had replaced the cæcum and vermiform appendix. Pathologically it was made up of a fibroid induration, infiltrated with tubercle bacilli.

Trombetta, in a somewhat similar case, in which there was involvement of the cæcum and ascending colon, extirpated the diseased tissue and made an artificial anus. The patient perished of peritonitis on the fifteenth day. The tumor was found to be the result of a typhlitis and perityphlitis, and was riddled with small abscesses.

Treatment of Urinary Fistulæ.

Guyon (*Revue général de Clin. et de Thérap.*, No. 23, 1889) insists upon the clinical importance of the pathological anatomy of urinary fistulæ. Dissections show that there is always a pocket surrounding the urethra, representing the region into which extravasation first took place. This pocket is lined

with an imperfectly organized, frequently fungous, granulation tissue. It is from this central, peri-urethral cavity, the primary result of urethral rupture, that the fistulæ radiate.

Clinically, patients suffering from fistulæ can be relegated to one of the following classes:

1. Those in whom the perineum is nearly normal, and who suffer from a single fistula.

2. Those in whom there is a more or less extensive tumefaction and induration, with several fistulous openings.

3. Those in whom there are multiple weeping fistulæ, with numerous indurated, irregular proliferations developed about the openings.

In the first class of cases, the normal calibre of the urethra having been restored by dilatation or internal urethrotomy, the galvanic cautery or strong tincture of iodine applied along the ulcerating tract will usually suffice for a cure, without the need of continued or intermittent catheterism.

Although it is at times possible to cure the cases coming under the second and third classifications by the same means, this is rarely accomplished. These cases should be placed in the obstetrical position, and thoroughly examined. The whole perineum is carefully palpated. If the urine contains pus and runs freely from the fistulous orifices, the existence of a central cavity is certain. If, however, urine only escapes on pressure, the passage to the urethra may be direct, and cauterization may be tried with some hope of success. In the majority of these cases, however, a formal operation is required. A median incision should be made into the perineum, and a careful dissection should be made till the central cavity is exposed. The position of the urethra should be then determined by feeling for its cord-like continuation, or by means of a sound passed from the meatus into the bladder. Then all the fistulous tracts should be laid fully open, either by cutting from within outward or the reverse. After which the fibrous walls of the central cavity are entirely removed by means of the knife or scissors. This may necessitate an enormous wound, but the surgeon need have no anxiety on this score, as it will be completely closed in by granulations.

In the treatment of urinary extravasation Guyon insists, as a means of avoiding subsequent fistulæ, upon entering the knife to the very depth of the urinary accumulation till it is in close relation with the urethra. A drainage tube should be carried to the bottom of this wound, and left in place for several weeks.

Operative Treatment of Incontinence of Urine.

An ingenious and novel treatment for the cure of obstinate and persistent urinary incontinence, is described by Gersung (*Centralblatt für Chirurgie*, No. 25, 1889). This treatment was successfully applied in the case of a girl aged fourteen years, suffering from incontinence since birth. Examination showed a split and patulous condition of the urethra. There had been an operation performed when the patient was one year old, entirely unsuccessful in its result. In the recumbent position the urine could be retained for a short time, and voluntarily discharged, but when the patient was up and about there was a constant dribbling. At first an attempt was made to diminish

the calibre of the urethra by excising a longitudinal strip of its mucous membrane, and restoring the continuity of the canal by suture. For three days there was decided improvement, due, undoubtedly, to inflammatory swelling, but on the fourth day, and thereafter, the condition was precisely the same as before. Six weeks later Pawlik's procedure of excising a wedge-shaped piece from the surrounding connective tissue, so that subsequent cicatricial contraction should provide an elastic occluder, was suggested and carried into effect, with so much success that the urine could be retained for two hours. Five years later the patient again returned to the hospital for treatment. In the sitting posture she could retain her water for an hour, but when standing or walking, and often even while lying down, there was constant dribbling. Apparently the only thing left for this unfortunate was a complete occlusion of the urethra, together with supra-pubic puncture of the bladder and the establishment of a fistula. Before resorting to this, however, an entirely new operation was devised and successfully executed. A crucial incision was made about the external orifice of the urethra, the latter was dissected out, together with a somewhat thick layer of surrounding connective tissue, to the extent of nearly an inch, was twisted upon its long axis 180 degrees, and was then sewed in this position. Seven days later the stitches were taken out; there was some little sloughing about the urethral orifice, but the new position was maintained. There resulted decided improvement; while lying or sitting the urine could be retained several hours, but on standing there was still a constant dribbling. Three weeks later the urethra was freed for nearly a half inch of its length, twisted 90 degrees further in the same direction as before, and again sutured in this position. There was retention for two days, but after that the water could be passed voluntarily. The improvement was not marked; in the erect position the urine could not be retained more than ten minutes. A month later the urethra was freed as before, but to a greater extent, again twisted 180 degrees and secured in place by seven silk sutures. Catheterization was required for a few days. Eight days after the operation all the sutures were removed. Healing *per primam*. At first urine was passed only by means of prolonged muscular effort, ten minutes being required for each emptying of the bladder. Four months after the operation the patient experienced an urgent desire to micturate at intervals of about five hours; the water passed slowly but without muscular effort, and she remained absolutely cured of her incontinence. The particular value of the operation lies in the fact that an elastic occluder is provided which can be readily and accurately modified by a simple operative procedure. The urethral mucous membrane is thrown into spiral folds which completely close the lumen of the canal at about its middle. This operation would seem to be particularly indicated in cases in which the vesical sphincter is anatomically or physiologically wanting. For its successful termination a functional activity of the vesical detrusors would seem necessary. Yet, were this absent, its place might be supplied by manual pressure, and it is by no means certain that cases of exstrophy of the bladder, which have been operated upon successfully, might not hope for continence of urine as a result of this urethral twisting.

The operation is, of course, easier in women than in men. If attempted in the male the urethra should be divided behind the bulb, the proximal end

should be twisted, and the continuity of the tube should be restored by suture. It would be difficult to decide upon the precise amount of twisting necessary. Gersung advises that the urethra should be narrowed to the extent of opposing a slight resistance to the passage of a small catheter.

Ligature of the Femoral Vein.

By a careful study of the literature bearing upon this subject Maubrac (*Arch. gén. de Méd.*, Jan. and Feb. 1889) endeavors to throw additional light upon the still disputed question as to the best operative treatment of wounds of the femoral vein. These cases should be grouped into two classes, namely, those in which the vein is injured in extirpation of tumors, and those in which it is accidentally cut or ruptured. In the first class of cases collateral circulation is, to a certain extent, established; indeed, the femoral vein may be completely obliterated without the appearance of the slightest œdema. The statistics of cases belonging to the first class are as follows:

1. Ligature of the femoral vein alone, twenty-one cases, with nine deaths; two of these deaths were due to septicæmia. There was no fatal issue due to gangrene.

2. Ligature of both inguinal vessels (artery and vein), ten cases. Six deaths, three from gangrene, three from septicæmia.

3. Ligature of the inguinal and deep femoral vessels. Nine cases, with a mortality of 100 per cent. Six cases died of gangrene, two of septicæmia, and one of pneumonia.

From these figures the following conclusions are drawn:

If, in the extirpation of a tumor in the inguinal region, the femoral vein is injured, both ends should be ligated. Simultaneous ligation of both femoral vessels produces a most dangerous disturbance of circulation. If the deep vessels are intact there is some hope of success, but on the first sign of gangrene amputation at the hip should be performed.

Of the cases of wound of the femoral vein suddenly and accidentally inflicted, but four instances are recorded in which the vein alone was involved. They all terminated fatally; two with and two without gangrene. Of three cases in which both femoral vein and artery were ligated, all recovered, amputation for gangrene being required, however, in two of these. Amputation for gangrene was required in three cases where, in addition to the common femoral vessels, the deep femoral artery and vein were tied; one terminated fatally. Ligature of the femoral vessels in various portions of Scarpa's triangle gave in twenty-five cases, gangrene twelve times.

From these figures Maubrac advises, in case of wound of the femoral vein, tamponade with iodoform gauze; if this fails, the vein should be secured by a double ligature, and the artery should be compressed in the inguinal region. If ligature of the artery is considered advisable, it should be performed below the origin of the profunda femoris.

In suitable cases the lateral ligation or suture is strongly commended; it is a means readily applied, requires only a moderate disturbance of surrounding connective tissue, increases the chances of healing by first intention, and preserves the lumen of the vessel intact. In four cases of lateral ligature, two were cured, two died of secondary hemorrhage and septicæmia. Three cases

of lateral suture all recovered. In four cases where the wound was closed by hæmostatic forceps, which were left in place, three died, partly from septicæmia and partly from gangrene; one of these cases was in the pre-antiseptic time.

The Operative Treatment of Irreducible Shoulder-joint Luxation.

A critical study of the operative methods of dealing with old traumatic irreducible luxations of the shoulder-joint is contributed by Bruns (*Beiträge zur klin. Chirurg.*, Bd. iv. Heft 2). He particularly considers the choice between restoring the humerus to its proper position and resection with division of adhesions. Ten cases of arthrotomy gave two deaths, one pseudarthrosis, three subsequent resections, and four cases of marked improvement. The outcome of two cases could not be determined. Twenty cases of shoulder-joint resection were followed by four deaths; the result in the other cases was satisfactory, in some instances exceedingly so. Reduction by formal operation would seem to be indicated only in cases of recent irreducible luxation; in old cases resection should always be preferred.

Successful Case of Spinal Resection.

Dawbarn (*N. Y. Medical Journal*, June 29, 1889) reports a case of spinal resection for fracture, in which some improvement was noted after operation. The patient had a fall, lost consciousness, and on awakening was without sensation or power of motion in the parts below the ribs. Evident displacement of the spinous processes of the eleventh and twelfth dorsal vertebræ, especially the latter, which projected posteriorly. The patient was treated by braces, massage, and electricity for six months, with slight improvement at first, later muscular atrophy seemed progressive. Operation was decided upon, and with the idea of replacing the detached portions of the column an H-shaped incision was made, the long arms running on either side of the middle line of the back. After section through the laminæ the latter could be raised from the cord with the flaps, thus preserving muscular and fibrous attachments and insuring the preservation of the vitality of the bone. The right eleventh lamina was crushed below the level of its fellows and was so firmly adherent to the theca that its removal was a difficult matter. The cord being freely exposed was found to form a distinct angle projecting backward. There had evidently been a fracture of the body of the twelfth dorsal, which had been thrown backward. To free the cord from any possible pressure the posterior arches of the tenth, eleventh, and twelfth dorsal vertebræ were removed. The patient's condition requiring immediate termination of the operation, the theca was not opened. Antiseptic dressing. Completed by a plaster jacket. Much pain afterward; relieved by trapping the plaster. Wound healed *per primam*. There has been marked improvement (ten weeks) in his condition since operation. Muscular reaction to electricity is better, there is no longer pain on motion. The bladder and rectum begin to show some evidence of returning control, and the temperature of his legs has become normal, or nearly so. The writer concludes from this case and a study of others on record, that:

"Whenever, following traumatism, even a slight abrupt irregularity of the spinal column is observed to coexist with paraplegia from this level, a cutting operation is indicated to determine whether the paralysis is not, by bony pressure, made incapable of spontaneous relief. This operation should be deferred no longer than recovery from the original shock of the injury demands. If needed at all, it is needed early; and we make a mistake if, as in my case, we wait until electricity and time have alike proved futile before attempting what I may call exploratory resection. It will be the easier by far to the surgeon at this early stage, and the safer for the patient; at least when the obvious displacement is due to a broken posterior arch, as then comparatively little bony section would be needed, the fragments not having become consolidated by bony union in their false position."

OTOLOGY.

UNDER THE CHARGE OF

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Menthol in Furunculosis of the External Auditory Canal.

Dr. R. Cholewa, of Berlin, has treated successfully furunculosis in the ear by means of a twenty per cent. solution of menthol in oil, applied on cotton tufts to the canal of the ear. This is held to be antibacterial treatment. These tampons of cotton soaked in menthol solution exercise a slight pressure on the infiltrated spot. The slight burning soon ceases, and in the place of the darting pain, come relief and sleep at night. The cotton tufts can remain twenty-four hours in place, if there is no suppuration. If suppuration occurs, the boil must be opened.

Artificial Drum-membrane as a Curative Agent.

Dr. H. N. Spencer, of St. Louis, Mo., has recently contributed a paper of great value on the above-named subject (*St. Louis Polyclinic*, July, 1889). The author, in 1876, at the International Medical Congress in Philadelphia, advanced two conclusions to a paper on the use of the artificial drum-membrane, viz.: 1. "Of the various forms of artificial drum-membrane in use, the cotton pellet is preferable for its great simplicity and easier introduction, for comparative safety in its employment, and for the greater uniformity of its effect." 2. "It has an advantage over other forms of artificial drum-membrane in that to the considerations named there may be added its value as a means of treating the tympanum; *and this therapeutical use of the artificial membrane has a great future in otology.*"

The present paper considers the fulfilment of the prophecy then made.

Dr. Spencer inserts what he terms a "*dry medicated* artificial membrane, made of cotton agitated in finely powdered boric acid until the powder is thoroughly incorporated in all the interstices of the fibre. The cotton pellet thus prepared is then inserted as far as the fundus of the canal by means of the angular forceps.

It is claimed that the use of such an artificial drum-membrane favors the growth of a new membrane. It may be used even when the ear is discharging, as it tends to check the latter. Two cases are cited in which the hearing was improved, and the condition of the ear greatly benefited by this means of treatment.

Three Cases of Aural Polypus in which the Neoplasm was of Great Size, and produced Serious Constitutional Symptoms.

Dr. R. W. Seiss, of Philadelphia, contributes a paper with the above title in a recent number of the *University Medical Magazine*, July, 1889. In the first case, a woman, twenty-one years old, was affected with epileptiform seizures from the presence of a large polypus, extending from the drum to beyond the meatus externus. As soon as this peripheral irritation was removed the woman recovered.

In the second case, a man, twenty-three years old, was found to have complete paresis of the facial nerve, marked vertigo, weakness, and pallor. Examination revealed a large rugous polypus in the ear of the affected side. In the course of five or six weeks after removal of the polyp and antiseptic treatment of the ear, the paresis had disappeared, and the general health greatly improved.

In a third case, that of a man twenty-one years old, there had been a slight bloody discharge from the right ear for eight years, recently there had been pain. The patient had been weak, easily nauseated, and faint. A large, tough, mulberry-like polypus projected from the meatus; upon its removal the man's condition immediately improved.

Thirteen Cases of Chronic Purulent Otitis Media, treated by Excision of the Auditory Ossicles; with Remarks.

Dr. C. J. Colles, of New York, has published an article with the above-named title in a recent number of the *Deutsche med. Wochenschrift* (No. 28, 1889).

After observing that the usual local treatment for chronic otorrhœa in many cases fails to bring about a cure, because the disease lying in the ossicles which have become necrotic, and the latter being held in the drum-cavity by synechial bands and the remnants of the membrana tympani and the normal ligaments of the ossicles, drainage is interfered with, and the diseased elements retained in the cavity of the attic. It has, therefore, become apparent to aurists that these diseased tissues, which prolong the suppuration, must be removed by excision if a radical cure is to be obtained. Hence, Schwartze, Kessel, and others in Germany, and Sexton, in this country, have practised excision of the remnants of the ossicles and the membrana tympani in cases of obstinate purulent otitis media.

Dr. Sexton, in a recent work on the ear, gives an account of excision of these diseased remnants in twenty-nine cases of chronic purulent otitis media, which had defied all forms of the usual routine treatment for chronic otorrhœa.

The operation is performed by him under ether, and the illumination of the ear, in which a light must be brought near the organ, is accomplished by means of an electric lamp held on the forehead by a head-band, like that of the forehead mirror, and supplied from a small portable storage battery.

Dr. Colles adds the notes of thirteen cases of this operation for the cure of chronic purulency of the ear, occurring in Dr. Sexton's practice.

The results were eight cures, and five cases much improved in hearing, and in obtaining freedom from attacks of earache, tinnitus, and vertigo. The ages of the patients varied from four years to forty-two years.

We wish that more were said as to the after-treatment, if there was any, carried out in these cases, but not a word is said as to the detail of operation, nor what course of treatment or hygiene was pursued. In our experience with this operation, the results are best where at least a mild antiseptic after-treatment has been observed. This may be no more pretentious than keeping the meatus hermetically plugged for some days, or until cicatrization sets in, with cotton impregnated with boric acid or iodoform. In our opinion, in many cases, this operation is the only method of obtaining a cure of the chronic suppuration. When we consider how important to health and life a cure of chronic suppuration of any part of the middle ear is, this operation is worthy of all attention and the most careful elaboration on the part of aurists.

Electrolysis in Chronic Suppuration of the Middle Ear.

Gruber, of Vienna, has applied Voltolini's method of electrolysis in the cure of nasal polypi, to granulations and polypi in the ear (*Wiener med. Blätter*, No. 8, 1889). He concludes that electrolysis easily causes granulation and polypi in the ear quickly to disappear. The effect is the prompter, the stronger the current and the longer it can be endured by the patient. But it is usually a painful process. Polypi as large as peas were made to disappear, after one application of electricity, in thirteen days. In some cases, however, small granulations required longer treatment. The otorrhœa did not always cease with the disappearance of the polypi. The method is so painful that it is advised only when no instrument can be used. We must say we have never met a granulation or polyp so small as not to permit snaring or hooking off.

Two methods have been employed; one in which the kathode is placed on the mastoid while the anode is placed as deeply as possible in the growth. In the other method, both poles are armed with needles, which are separated from 1 to 2 mm., and are then both placed in the growth. In both cases a current from ten elements of a Siemens and Halske's battery was employed, and this was endured not more than two minutes by any patient.

Microörganisms in the Secretions of Otitis Media Acuta.

During the past two years, Dr. E. Zaufal, of Prague, has been publishing his researches among the microörganisms found in the secretion of acute

purulent otitis (*Präger med. Wochenschr.*, July 6, 1887; *ibid.*, 1888, Nos. 20, 21, and 45; *ibid.*, 1889, Nos. 6, 12, and 15).

The author lays before him three cardinal questions, viz.:

1. Which microörganisms are found in the secretion of acute purulent inflammation of the middle ear?

2. Are such microörganisms found in the tissue of the inflamed mucous membrane of the tympanic cavity?

3. Is it possible to produce otitis media by artificial inoculation of the pure cultures of the microörganisms concerned?

The investigator took the material by paracentesis from otherwise healthy individuals, affected only with acute rhinitis, pharyngitis, ozæna, or bronchitis, but who had *no pneumonia*. The matter thus obtained was divided into two groups, in the bacteriological examinations. There was found in the sero-sanguinolent secretion the capsule-bacillus of Friedländer, and in the sero-purulent secretion the pneumo-diplococcus of A. Fränkel, as pure cultures. Both can cause croupous pneumonia. The former is found in the nasal secretion in acute coryza, and the latter may be found in normal saliva. The microbes can pass up the Eustachian tube into the middle ear and cause otitis media; especially when the mucous membrane of the tube and middle ear are rendered a propitious soil by colds in the head. Three conclusions are then formulated, as follows:

1. The normal tympanic cavity of animals (rabbits) is, as a rule, not free from germs. Though few in number they are capable of development.

2. The mechanism of the Eustachian tube is sufficient, in normal circumstances, to probibit the passage of numerous germs into the drum-cavity. Yet it is never in so perfect a condition as to prohibit entirely the passage of some germs.

3. From the entrance of the nose to the tubal openings and the drum-cavities, the number of germs rapidly diminishes. While the number at the mouth of the tube may be considerable, the number in the drum-cavity is reduced to a minimum.

The author describes four forms of infection:

1. Auto-infection, in which "dormant" pathogenic germs begin to grow and penetrate the tissue, through nutrient changes in the mucous membrane.

2. Infection by mechanical action of the Eustachian tube, by which microbes in the nasal secretions are forced into the drum cavity in large numbers and full virulence.

3. Infection in which the microörganisms which have grown in the tissue of the naso-pharynx, invade the mucous membrane of the drum-cavity, by way of the lymphatics and bloodvessels of the submucosa and the mucous membrane of the Eustachian tube.

4. Hæmatogenous infection, which, however, according to Trautmann, occurs only in acute endocarditis.

The Effects of the Discharge of Fire-arms upon the Ear.

H. Nimier, Surgeon-major, has formed some conclusions on this topic which are published in the *Archives de Médecine et de Pharmacie militaires* (No. 7, July, 1889), as follow:

1. The detonation caused by the discharge of fire-arms is a complex noise caused by: *a*, the vibrations of the barrel of the piece, excited by the passage of the projectile; *b*, those resulting from the transmission of movement to the accessory parts of the weapon and to neighboring objects; *c*, those excited in the projectile itself at the moment of its leaving the barrel of the piece, in which it has been rubbed; *d*, and, finally, the actual waves of sound, caused both by the projectile in its passage and by the gases due to the deflagration of the charge.

2. The effect of the discharge of fire-arms upon the ear results, in most cases, not from the shock of the explosion of gases, but from the action of sonorous waves transmitted to the membrana tympani and all of the acoustic apparatus.

3. The popular practice of looking toward the mouth of the cannon, of slightly separating the jaws and lips at the time of the discharge, as well as the want of confidence in the utility of a tampon of cotton in the ears, are in accordance with the views of the author.

4. The discharge of fire-arms can produce, beside rupture of the membrana tympani, deafness and subjective noises and various functional disturbances of a reflex nature, especially in the sphere of the bulbar nerves.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Chronic Catarrh of the Nasopharyngeal Cavity and the Bursa Pharyngea.

In an excellent paper read before the Medical Society of Basel, F. Siebenmann shows (*Corresp. Bl. f. Schweizer Aerzt*, June 15, 1889) that he is one of the few who have acquired a correct conception of the long misunderstood nasopharyngeal catarrh. His literary studies of the lymphoid nodular mass known as the pharyngeal tonsil, the earliest description of which he credits to C. Schneider in 1655, have been supplemented by a series of careful dissections of the region in subjects of all ages and in the fœtus; the details of which we commend to the perusal of those interested. He duly recognizes and confirms the often unacknowledged clinical and pathological studies of Wendt, who, years ago, published much that has been claimed as of entirely recent acquisition.

With Ganghofner, Schwabach, and others, Siebenmann denies the existence of a pharyngeal bursa in the sense taken by Mayer, Luschka, and others; he attributes the morbid secretions of catarrh to the entire surface of the lymphoid mass instead of being confined to its median fissure or recess; he has found

cystic formations in more than one-third of the cases he has examined; he treats even moderate cases of hypertrophy by shaving them off with Gottstein's knife as he does the severe ones; and he has usually seen hypertrophic tumefactions of the turbinates and of the septum narium subside spontaneously after abscission of the diseased tonsillar mass.

Bilateral Osseous Occlusion of the Choanæ.

B. Fraenkel reported an instance of this rare condition to the Laryngological Society of Berlin (*Berliner klin. Woch.*, July 8, 1889), in a patient eighteen years of age. Rhinoscopically there was some little variation from the usual condition. The septum projected posteriorly as a small free ledge for about three millimetres. The membrane was visible anteriorly, owing to atrophy of the turbinates. There was no olfaction, and but little sense of taste; sweets and bitters being recognized the best. The membrane was perforated with a trocar.

Secondary Fibrinous Rhinitis.

At the Eighth Congress for Internal Medicine, at Wiesbaden, Dr. Seifert, of Wurzburg, reported (*Wien. klin. Woch.*, No. 87, 1889) a case and demonstrated some specimens from it. A youth, seventeen years old, applied June 25, 1888, with ichthyosis. Three weeks previously he had recovered from a pneumonia which had left him with impaired respiration, and for a few days he had been hoarse. He was quite decrepit. He exhaled a fetid odor. The pharynx and epiglottis were reddened. The larynx could not be inspected despite cocainization. The dyspnœa and hoarseness rapidly increased and a greenish-yellow deposit formed on the pharynx and could not be washed off. Then both nasal passages became occluded; a greasy secretion escaped from the nose, and eczema appeared at the orifices. The mucous membrane of the turbinate bodies and the septum was covered with a thin, efflorescent, yellowish-green deposit. On the fifth day fibrinous masses were coughed out from the bronchi. Finally, the nose became impermeable, the voice toneless, and laryngeal stridor occurred with incurvation of the epigastrum, and dysphagia. On the eighth day tracheotomy became necessary. Great masses of pseudo-membrane were removed from the pharynx. The operation produced but slight relief; collapse ensued, and the patient died twenty-four hours after the operation. Body temperature had been but slightly elevated. Membranes were found in the nose, pharynx, larynx, trachea, and bronchi. Thus, in sequence to pneumonia a fibrinous exudation had developed on the mucous membrane of the entire respiratory tract.

Colonies of cocci, but no chains, were found in the exudation and in the lymph spaces of the mucous membrane of the lower turbinate body. The condition, therefore, differed from that of diphtheria. There was a thin exudation upon intact epithelium with cellular infiltration of the submucous layer and of the epithelium.

Pachydermia Laryngis.

Dr. L. Rethi reports and illustrates (*Wiener klin. Woch.*, No. 27, 1889) a case in a railroad conductor forty-three years of age. The lesion consisted in

nearly symmetric thickenings of the vocal bands in the region of the posterior vocal processes, with central longitudinal depressions in the tumid masses. He discusses the views of Virchow and of B. Fränkel as to its pathological histology, and recognizes the difficulties in its discrimination from other lesions. The question of alcoholism and cantation advanced hy Virchow as concurrent etiological factors is not broached in this paper. The main interest of the case lies in the production of the characteristic indentation while the patient was under observation.

Multiple Sarcoma of Larynx and Trachea.

Professor Schnitzler has reported (*Wiener klin. Woch.*, No. 23, 1889) a case in which symptoms of disease had been but a few weeks in progress. There were right-sided infiltration of the laryngeal surface of the epiglottis and marked and uniform tumefaction of the right ventricular band. This tumefaction was destroyed with the electric cautery. A tumor, larger than a hazel-nut, was then discovered below the left vocal band, and subsequently a similar one in the right wall of the trachea. Microscopic inspection of fragments cut for the purpose from the infiltrated epiglottis, and the remnant of ventricular band revealed round-celled sarcoma.

A few days later deep tracheotomy was performed by Professor Frisch, who removed from the trachea five or six neoplasms varying in size from lentils to large hazel-nuts. The tumors above the glottis were then entirely destroyed with the electric cautery, and the patient was regarded as cured. Professor von Frisch stated that after performing tracheotomy just above the jugular fossa and inserting a tampon canula, he split the trachea open from the cricoid cartilage. The anterior wall was free from tumors. Two growths about the size of hazel-nuts were found laterally; one over the left side of the cricoid cartilage and the first ring of the trachea; the other, on the right side lower down. Still lower there was a group of five smaller growths in the neighborhood of the fifth to the seventh cartilages, rather loosely attached to the mucous membrane and in the posterior and lateral walls. All the tumors were removed by scraping, and their bases were scorched with the thermo-cautery. The canula was removed on the fourteenth day.

Tuberculosis of the Larynx.

In a paper read by Professor H. Krause, of Berlin, before the last Congresse für innere Medicin (*Therap. Monats.*, May, 1889) he summarizes the results of the treatment with frictions of lactic acid introduced by him in 1885. For a long time, he has rarely used lactic acid in stronger solution than 50 per cent.; whereas, formerly, he used it in much stronger solution, 80 per cent., and even occasionally undiluted. His experience, after four years' use of lactic acid, has remained the same as announced in his initial paper. The results are satisfactory in the majority of severe cases, sometimes remarkably prompt and happy. Some of his patients have remained cured for more than two years. In two of those who had had deep ulceration, recurring lesions did not take place for more than two years. He acknowledges that cures are not always thorough in a purely anatomical sense. He has frequently found

on post-mortem examination of patients whose larynges had shown complete cicatrization laryngoscopically, that uncicatrized ulcers were found in locations difficult of reach, such as the ventricles, and the lower cavity of the larynx. The lack of cure in these instances, however, are to be attributed to the inaccessibility of the lesion, and not to the inefficiency of the remedial agents. Curetting, as advised by Heryng, previous to the use of the lactic acid, is indicated in the presence of thick bordered ulcers and extensive infiltration.

The accessible lesions most difficult to manage and the worst in prognosis are infiltrations of the epiglottis. Swellings in the lingual surface of the epiglottis are to be combated by treating the ulcerations and infiltrations of the laryngeal surface to which they are most usually due.

In curetting, Krause now uses a double curette of his own construction, a description of which does not appear in this article. It is probably a cutting forceps.

A few typical cases are reported in some detail.

DERMATOLOGY.

UNDER THE CHARGE OF

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On Paget's Disease of the Nipple.

Recent observations have led Darier to believe (*British Medical Journal*, June 1, 1889) that Paget's disease is a form of cutaneous psorospermosis. Examinations of the epidermic scales and sections of skin from the affected area, properly prepared, disclosed the presence of round bodies, which were, according to the writer's opinion, undeniably psorospermiæ or conidia. Similar bodies, it is well known, have been found in other cases of epithelioma. It is probable, the author states, that Paget's disease of the nipple is caused by these parasites.

Treatment of Purpura Hæmorrhagica by Nitrate of Silver.

In the especially grave variety of purpura hæmorrhagica which Poulet describes as the "asthenic" form (*Bull. générale de Thérapeutique*, May 3, 1889), he has found in a number of cases that the administration of nitrate of silver has acted as a specific, and in a surprisingly rapid manner. The notes of two of these cases are given, in which symptoms of an alarming character were

present. Other remedies had been without influence. The nitrate of silver was given in the ordinary dose, and improvement rapidly ensued. The author believes that the remedy profoundly influences the capillary circulation by its impression on the vaso-motor nerves.

Treatment of Nævi by Electrolysis.

In some years' experience Marshall has reached the conclusion (*Lancet*, Jan. 12, 1889) that, upon the whole, electrolysis constitutes the best method for the removal of nævi. Its advantages are: (1) That there is no after-pain; (2) It is free from danger; (3) There is no bleeding; (4) The scar is white, and does not tend to contraction in loose structures, like the eyelids. Its main disadvantage is its slowness, for, while in exceptional instances nævi may be cured at one sitting without sloughing, it is unwise to attempt so much, as the chances are against a satisfactory result. It is better to have recourse to several such applications at intervals. The author's method consists in inserting the needle attached to the *positive* pole well under the surface of the growth, and then, after remaining in one spot long enough for some effect, to move it to other parts without withdrawing the needle. The circuit is made by attaching a rheophore to the negative pole; in this manner an unnecessary puncture is avoided. Before withdrawal of the needle it is first rotated. The orifice is painted over with collodion. A current from five to ten Leclanché cells is generally sufficient. Change in color to a dusky hue is an indication that the action has been sufficiently long continued.

An Anomalous Form of Eczema.

Mapother has met with (*British Medical Journal*, January 5, 1889) several cases of apparently eczematous disease involving the tragus and hairless skin in front of it, which have borne a striking resemblance to Paget's disease of the mammary areola. He quotes Crocker as having seen a similar condition on the scrotum. These regions have some physiological analogies: in all, the sebaceous glands are very large.

The several cases here embraced were characterized by a uniform, florid, oozing surface without granulations, hard and slightly raised, but without the rolled-over edges of rodent ulcer; without pain or much itching; stubbornness to treatment, and with, after healing, a slightly depressed unpigmented cicatrix remaining.

The Treatment of Hypertrichosis.

Jamison (A.) describes in *The Practitioner* for July, 1889, a method which he has successfully employed in removing hairy moles and excessive hair growth upon unusual parts. It consists in the application of sodium ethylate. The notes of a case in which this plan was practised are given. The patient was a child of three months, the whole right half of whose forehead was closely covered with a growth of long hair. Under chloroform, after cutting the hair short on a part of the involved area, sodium ethylate was rubbed over the cleared surface "very freely and thoroughly till the skin had an orange appearance." Cold cream was then applied. At the end of

a fortnight the result was seen, and was most gratifying. "The hair-follicles over the greater part of where the application had been made seemed destroyed, and a whitish skin remained." Other parts were from time to time treated in the same manner, and the final result was satisfactory.

Zoster Gangrænosus Atypicus.

In the *Wiener klinische Wochenschrift* of March 7, 1889, Kaposi contributes, under the above designation, the notes of two cases of an anomalous herpetic disease. Both patients were females of a nervous temperament. The eruption occurs in patches or groups, similar to ordinary zoster, beginning usually as a somewhat elevated efflorescence, showing, in a day or two, scattered thickly over its area, subepidermic darkish or brownish points. The redness fades, and the gangrenous points rapidly involve the epiderm, and the patch then appears as a superficial, incompletely formed dry slough; or suppuration beneath the sloughing points takes place, and gives the patch the appearance of a dotted, superficial, sharply outlined erosion or ulceration. One or more patches may be present, and may be irregularly distributed. In four to eight days the disease tends to retrograde, disappearing entirely at the end of a few weeks, leaving behind, as a rule, more or less scarring with a keloidal tendency. In the one case a number of such attacks had occurred. The patches when developed suggested an artificial origin—from caustic potash or nitric acid—but when studied carefully it could be seen that the beginning of the process was subepidermal, involving primarily the corium. The disease, while unquestionably neurotic, differs from that which has been described as "herpes zoster gangrænosus" by the recurrence of the attacks, its irregular localization, and also by the fact that the eruption is not confined to one side.

Trichomycosis Nodosa.

Patterson describes (*British Medical Journal*, May 25, 1889), under this name, a nodose condition of the hairs of the axillæ and scrotum, the same as that to which Paxton and Behrend had previously called attention. The hairs, while appearing dry, are not, excepting at the nodules, abnormally brittle. They feel rough and knotted, and the knotting may be either nodular or diffuse. The author considers, from his investigations, that the affection is of bacterial origin, small rod-shaped bacteria growing in the cortical layers of the shaft having been found. The hair is not deeply penetrated, nor are the follicles invaded. The writer believes that the affection has often been confounded with trichorexis nodosa.

Xeroderma Pigmentosum.

The notes of a typical case of this disease, illustrated by a chromo-lithograph, are contributed by McCall Anderson in the *British Medical Journal* of June 8, 1889. The antecedent family history was good. The patient's sister, however, had been similarly affected, and had died at the age of nine of an intercurrent lung affection. The disease in the present case, a boy aged nine, was first noticed when he was two years old. Nothing further was

noted at that time, however, than the appearance of "freckles" upon the face and neck, disappearing in the winter season, and recurring, in an increasing manner, during the summer. For the past few years other parts had been invaded, the pigmentation had become much darker, and the spots had, moreover, become permanent. In the last year small wart-like growths, telangiectases, and cicatrices had made their appearance on the face. Here and there also could be seen small atrophic areas, having a white and glazed appearance, and with a border of dilated capillaries. The growths were found to be epitheliomatous. As the author states, the true nature of this disease is as yet unknown, and treatment must be based on general principles.

Galvanism in the Treatment of Parasitic Skin Diseases.

Wessinger (*Journal of Cutaneous and Genito-urinary Diseases*, July, 1889) reports the cure of several cases of parasitic skin diseases by means of a parasiticide solution introduced into the invaded parts by means of the galvanic current. Among these several cases were one of favus of the scalp of eight months' standing, and one of tinea tonsurans of three months' duration; the writer states that the former was cured with six applications in six weeks, and the latter with ten applications in four weeks' time. A corrosive sublimate solution was the parasiticide employed.

[We give an abstract of this paper merely for the opportunity of stating that the same method was tried under our auspices in the Skin Dispensary of the Hospital of the University of Pennsylvania by Dr. Hartzell, in three typical cases of tinea tonsurans. This was even before Dr. Reynolds' paper on this subject had appeared. In each instance a prolonged application was made every other day, with absolutely no more progress toward cure than may be effected with the same solution without the galvanic current. The galvanic method was employed in these patients for at least six weeks and finally abandoned, and the disease eventually cured in the course of three to five months with the ordinary methods of treatment. In short, while theoretically we had hoped much from this plan, our experience with these three typical cases failed so utterly to bear out our expectations that further trial was thought unnecessary.—Eds.]

On the Treatment of Tinea Tonsurans.

Harrison presents in this paper (*British Medical Journal*, March 2, 1889) his method of treating tinea tonsurans. His plan is based upon the belief that the spores live and germinate within keratin tubes, and that keratin is not acted upon by most of the so-called parasiticides, and the conidia under such applications would remain undisturbed. The destruction of this keratin is effected by caustic alkalies, but these have no destroying action upon the spores. His method is, therefore, first to apply an alkali to the affected area, and then follow with a powerful parasiticide. These two actions he claims now to accomplish by a compound application: ℞.—Potassæ causticæ, grs. ix; acidi carbolici, grs. xxiv; lanolini, ol. cocoæ, āā ℥ ss, ft. ungt. A cure is generally brought about in from one to three months.

The Treatment of Psoriasis with Applications of Hydroxylaminum Muriate.

Fabry reports (*Archiv für Dermatologie und Syphilis*, H. 2, 1889) his experience with the hydroxylaminum in the treatment of this disease. The twenty-four cases on which the observations were made occurred in the service of Dr. Doutrelepont, of Bonn. The external use of the drug is here referred to, as its internal use has been found to have a paralyzing effect upon the nerve centres. Even its local application needs medical supervision. The remedy was applied either in alcoholic or aqueous solution, after neutralization with calcium carbonate. The strength employed varied from 1 : 1000 to 1 : 200. It is painted on the patches twice daily, and a cloth may be wetted with it and applied to suitable parts. Albumin may be occasionally found in the urine of patients so treated. Its advantages over chrysarobin and pyrogallic acid are cheapness, absence of staining, and the comparative infrequency of any irritating effect.

The Removal of Tattoo Marks.

In his letter to the *Journal of Cutaneous and Genito-urinary Diseases*, March, 1889, Brocq refers to the plan of treatment practised by Variot for the removal of tattoo marks. The method consists in freely painting the part with a strong tannin solution and then immediately pricking the skin with a bunch of needles in order that the tannin may penetrate deeply. The operated surface is then rubbed vigorously with nitrate of silver. The pricked points in the course of a few moments become black, and the surface is then wiped off. Varying degrees of inflammation ensue, with more or less pain on motion. In about two weeks the eschar becomes spontaneously detached, beneath which is seen a red cicatrix. In due time the redness disappears.

The statement of Dupuy that the natives of the Indian Archipelago remove tattoo marks, without leaving a scar, by making tattooings with the juice of the carica papaya, is also quoted.

OBSTETRICS.

UNDER THE CHARGE OF

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Diagnostic Points of Value in the First Three Months of Pregnancy.

Löhlein (*Deutsche med. Wochenschrift*, No. 25, 1889) regards Hegar's sign, softening of the lower uterine segment, as a most valuable sign of early pregnancy. He has found the elastic, cystic feeling given by the body of the

uterus equally significant, often suggesting a bicornate uterus. This condition is present from the second half of the second month to the end of the third; it is best appreciated by bimanual examination, often *per rectum*.

Auscultation of the fœtal movements is also a valuable sign, applicable three or four weeks before life is felt. In a case of small ovarian cyst with disordered menstruation and bluish vagina, he was deceived by contractions of the recti and oblique muscles.

Practical Points from Sections made upon Women Dying in Labor.

Barbour (*Edinburgh Medical Journal*, July, 1889), from the study of frozen sections, finds that the mechanism of labor does not properly begin until the head enters the pelvic cavity. The bony pelvis is encroached upon by soft parts in the living patient at the brim, one-fifth of an inch in the conjugate; transversely, one inch; obliquely, one-quarter inch. In the pelvic cavity the conjugate is lessened two-fifths of an inch; transverse diameter, one inch; obliques, three quarters of an inch plus a reducible one-half inch. The fœtal head measured—suboccipito-bregmatic diameter, four and one-quarter inches; occipito-frontal, four and one-half inches; occipito-mental, five inches: this was the unmoulded head before labor. Regarding the mechanism of labor, the fœtus grows in a condition of flexion which becomes less well marked as labor proceeds.

Labor Complicated by the Administration of One-fifth of a Grain of Strychnia.

Avrard (*Bulletin de la Société Obstétricale de Paris*, No. 6, 1889) reports the case of a primipara to whom a midwife had given strychnia aggregating one-fifth of a grain to secure vigorous pains. This result not following, a physician was called. The fœtus was found to be in cephalic presentation; dilatation of the os and cervix was complete. Traction with the forceps failing, the uterus was found tetanized and very hard. A hot bath was given, belladonna ointment was applied to the os, and under chloroform the head was brought to the pelvic floor by forceps and delivered. As the cord was about the neck, the attempt to deliver the shoulders rapidly was made, but failed. Rotation was very difficult from the uterine rigidity; the child was stillborn; the mother recovered without complications. None of the usual constitutional effects of the drug were observed; pains in the legs and convulsive movements were present. The patient's subsequent labor was marked by uterine inertia requiring forceps.

A Singular Error in Diagnosticating a Breech Presentation.

Loviot (*Ibid.*) describes a case of breech presentation in a primipara forty years old, in which the os uteri, but slightly dilated, was thought to be the child's anus, as it was smeared with meconium. Dilatation was thought complete when it had scarcely begun. The child was stillborn, after a tedious labor, during which the error became apparent to the obstetricians in attendance.

The Causes and Treatment of Retained Placenta.

Ahlfeld (*Zeitschrift für Geburtshülfe und Gynäkologie*, Band 16, Heft 2) considers a cause of retention of the placenta to be stricture of the cervix and lower uterine segment produced by irritability of the uterine tissues; this condition frequently follows efforts to expel the placenta by pressure. Adhesion of the placenta to the uterus is also a cause of placental retention. Such adhesion results from inflammation of the placenta (specific or septic), from maternal nephritis, and from causes as yet unknown.

Regarding treatment, the placenta should be expelled spontaneously, if possible, and care should be taken not to irritate the lower uterine segment (Ahlfeld practises the expectant method in delivering the placenta). When manual interference is necessary the hand should not be inserted in the uterus, but gentle traction should be made upon the edge of the placenta with two fingers within the cervix. The strictest precautions should be employed to keep the vagina and cervix aseptic. Ahlfeld reports thirteen cases of retained placenta, only four of which had normal puerperal periods: One died, the remainder suffered from more or less septic infection.

The Treatment of Retained Membranes.

Eberhart (*Ibid.*) states the practice followed in Kaltenbach's Clinic at Halle in retention of the membranes. It is believed that auto-infection does not occur unless the mother suffers from a pathological process during pregnancy which produces septic matter at labor. Normally, the uterine cavity is free from germs.

Retention of membranes is dangerous only when the membranes lie in the cervix and vagina, where they readily become infected. They should be removed from the cervix and vagina by two fingers gently inserted, but the uterine cavity should not be entered. The vagina should be frequently and thoroughly douched with antiseptic solution, and ergotin should be given to secure the expulsion of fragments remaining in the uterus.

Rupture and Suppuration of the Pelvic Joints complicating Parturition and the Puerperal State.

Dührssen (*Archiv für Gynäkologie*, Band 35, Heft 1) has collected thirty-two cases of rupture and suppuration of the pelvic joints complicating parturition and the puerperal state, to which he adds another, aggregating thirty-three. The passage of a large head; violence done by forceps; and in some cases in which a pathological condition exists in the joint, the passage of very large shoulders, are most frequent causes.

Suppuration may occur in pelvic joints not ruptured during labor; it is easily overlooked, but should be searched for when fever persists without apparent cause. The causes of suppuration in the pelvic joints are metastatic (pyæmic) inflammation; infection, not necessarily septic, from a vaginal wound occurring during the puerperal state; and tuberculosis. Fever, following rupture of the joints, during the first seven days after labor, does not necessarily denote pus formation; it may be caused by absorption of unde-

composed blood exudate; long-continued fever with pain and swelling at the symphyses denote suppuration.

The treatment should invariably be incision and drainage under antiseptic precautions. Such treatment should be promptly applied before burrowing abscesses form. After incision and drainage good bony union results from the formation of a bony callus.

The prognosis of these cases was formerly regarded as most unfavorable; when they occur as complications of puerperal septicæmia they share the prognosis of that condition. Of the reported cases, 70.9 per cent. died; those in which spontaneous rupture and evacuation of the abscess occurred, or incision and drainage were practised, recovered.

Dührssen's case was that of a multipara who had had difficult labors requiring manual termination by reason of the great size of the fœtal shoulders. Dührssen extracted with difficulty a large stillborn child. Suppuration and pus formation at the symphysis pubis followed; the joint was drained antiseptically. Fever continuing, a large abscess was found on the inner aspect of the thigh communicating with the first. When this was drained, prompt recovery followed.

Prolapse of the Genital Organs following Parturition.

Duplay and Chaput (*Archives Générales de Médecine*, July, 1889) conclude, from the examination of women who had borne children and suffered from prolapse of the genital organs, that the great majority of such conditions are caused by increase in the size of the vulvar orifice, with or without perineal injury. Prolapse of the anterior vaginal wall and cystocele result; the bladder becomes chronically over-distended, and drags upon the ureters, sometimes dislocating the kidneys.

By measurement it was found that prolapse of the vagina resulted when the vulvar orifice was one and a half inches in length, or when the tissues about the vulva were very elastic. An actual loss of tissue of one-fifth of an inch in the perineum favored prolapse. These observations were made upon the cadaver. Prolapse was the rule in old women. Uterine hypertrophy, alterations in the uterine ligaments and in the vagina were of secondary importance from the standpoint of an anatomical examination.

Experimental Puerperal Infection.

Straus and Sanchez-Toledo (*Nouvelles Archives d'Obstétrique et de Gynécologie*, No. 6, 1889) have experimented extensively upon animals to determine the condition of the genital tract after labor, and the circumstances attending puerperal infection. No microörganisms were found after normal labor. Cultures of the most virulent bacteria were injected into the uteri of rabbits and rats after labor, while the same cultures were injected beneath the skin of one of their young, as a control experiment. The intra-uterine experiment was without result; the subcutaneous injection was fatal. The bacillus of chicken cholera was an exception, and infected rabbits by intra-uterine injection. Histologically, the mucous membrane of the uterus in the lower animals is renewed at once after labor; this is not so in the human subject, but an open wound remains, hence the danger and frequency of infection.

Severe Puerperal Infection Successfully Treated by Continuous Irrigation.

Kalinczuk (*Prager medicinische Wochenschrift*, No. 27, 1889) reports the case of a multipara who suffered from severe septic infection after the birth of a macerated fœtus. Septic endometritis and beginning peritonitis were present. The patient's temperature resisted all antipyretic drugs, while the infection became more severe; repeated intra-uterine douches failed to reduce the temperature permanently. Accordingly 20 quarts of carbolic solution of one per cent. were allowed to run through the uterus during four hours' time. In all, 115 quarts of one per cent. solution were used in five days. Stimulants and food were freely given. Recovery followed, and a double pleural exudate, which was septic in origin, gradually disappeared.

Practical Antisepsis in Obstetric Practice.

Bokelmann (*Berliner klinische Wochenschrift*, No. 26, 1889) does not accept the theory of auto-infection, and considers prophylactic disinfection of the vagina irrational. The normal epithelia of the parts are fully capable of resisting the invasion of septic germs. He confines his attention to antisepsis of all which touches the patient and of her own external genitalia.

Fatal Intoxication with Bichloride of Mercury.

Legrand (*Annales de Gynécologie et d'Obstétrique*, June, 1889) reports the case of a multipara who aborted with one twin, and was brought into the hospital while the other remained in the uterus. The patient was anæmic, having suffered from metrorrhagia. After a vaginal douche of bichloride of mercury 1 to 2000 an intra-uterine douche of ten quarts of bichloride 1 to 2000 was given, followed by two quarts of boracic acid 1 to 50. Three hours later the douches were repeated; during their administration the patient complained of violent abdominal pain. Uterine contractions continued, and the second twin was expelled three hours later. The douches given subsequently were vaginal only, and were bichloride of mercury 1 to 2000, carbolic acid one per cent., and boracic acid, alternately.

The patient developed typical mercurial intoxication, and died six days later. Post-mortem examination revealed on gross inspection diphtheritic enteritis and acute nephritis. On chemical examination mercury was found in the kidneys only. Microscopical examination revealed very extensive disintegration of the epithelium of the kidney; sloughing ulcers in the intestine, especially in the large bowel; translucent swelling of the liver parenchyma; desquamative parotiditis; the pancreas was remarkably intact. A celluloid intra-uterine catheter was used in the douches, the receptacle for the fluid was held thirty-nine inches above the patient's bed.

The Prognosis of Pneumonia during Pregnancy.

Wallich (*Ann. de Gyn.*, June, 1889), reviewing the French literature of pneumonia during pregnancy, finds that pneumonia induces labor in one-third of all cases before the sixth month; from the sixth to the ninth month in

two-thirds of all cases. Maternal mortality varies from fifty to one hundred per cent. of recorded cases, and is generally caused by infection following abortion. Fœtal mortality was eighty per cent.

The Mechanism of Respiration in the Newborn.

Dohrn (*Münchener med. Wochenschrift*, No. 25, 1889) concludes from experimental studies of the respiration of the newborn that it is largely thoracic. Respiration begins above and extends downward, the function being gradually performed in its entirety. Soon after birth portions of the lung exist which are not yet inflated, a fact suggestive from a medico-legal view.

Maceration of the Living Fœtus.

Ribemont-Dessaignes (*Annales de Gynécologie et d'Obstétrique*, July, 1889) has observed a case in which a macerated fœtus was born living, and survived a few moments; he adds four cases seen by others. In some of them the fœtus died while passing through the vulva; in others it survived a few moments. In these cases the fœtus was large, its cellular tissue being infiltrated with serum. This œdema pitted very distinctly on pressure. The skin was pale and shining, the epidermis was raised in places by a clear opalescent lemon-colored fluid very different from the bloody serum seen after death. The exposed surface beneath these blebs was pale rose-colored, not deep red, as seen *post-mortem*. The largest blebs were upon the abdomen; they were found irregularly over the body, and were seen to be formed by the coalescing of very small vesicles. In labor they were ruptured by pressure, leaving an exposed surface.

Post-mortem examination of these bodies showed a blanched condition of the viscera; the peritoneum contained serum in abundance. These observations correct the older view that maceration occurred in the dead fœtus only.

Two Cases of Fœtal Malaria Transmitted by the Father.

Felkin (*Edinburgh Medical Journal*, June, 1889) reports two cases of fœtal malaria transmitted by the male parent. In one case near term the father had suffered severely, while the mother had never had a chill. Violent fœtal movements occurred periodically, finally inducing labor. The fœtal spleen was so large as to retard delivery. After birth the child had seven paroxysms of malarial infection, but recovered, the splenic tumor largely disappearing.

The second case was a miscarriage at seven months in a patient who had never had a chill, but whose husband suffered severely while on a voyage to the tropics. Two children born previously had paroxysms of shaking in the uterus, the survivor had enlarged spleen. Post-mortem examination of the seven-months fœtus showed the characteristic appearances of malarial infection.

GYNECOLOGY.

UNDER THE CHARGE OF

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OF NEW YORK.

The Value of the Tampon in the Diagnosis of Chronic Endometritis.

Schultze (*Centralblatt für Gyn.*, May 11, 1889) urges the use of the tannin and glycerin tampon, emphasizing the fact that the purulent character of the uterine discharge, and not its amount, is the main indication of the existence of endometritis. The discharge is often so slight that the patient herself does not notice it, yet it is readily appreciated on the removal of a tampon which has lain in contact with the cervix for twenty-four or forty-eight hours. After practising this method daily for twelve years the writer can testify to its great practical value.

Tuberculosis of the Genital Tract.

Barbier (*Gaz. Méd.*, 1888, No. 39) believes that a woman can be infected by a tuberculous man during coitus. Bacilli have been demonstrated in the semen, as well as in the discharge attending tuberculous epididymitis. The uterus may be infected by extension from a tuberculous growth on the vulva, without any intermediate trace of infection in the vagina. The writer even admits the possibility that tuberculous infection may be transmitted by the finger of the attendant, by unclean instruments, or even through the medium of the air.

Ligation of the Arteries supplying the Uterus.

Gubaroff (*Centralblatt für Chirurgie*, No. 22) recommends this bold procedure in cases of inoperable cancer attended with severe hemorrhage, intraligamentous tumors, and subserous myomata, and for the relief of metrorrhagia of unknown origin which resists all ordinary treatment. The technique is as follows: An incision is made as in ligation of the common iliac, the lower angle of the wound being at the internal ring. When the peritoneum is reached it is stripped upward from the iliac fossa and the point of division of the common iliac is sought for. The peritoneum is drawn inward with a Sims's speculum until the internal iliac is exposed; the latter artery is then followed downward into the pelvis until the uterine is reached, the ureter being the guide to it at the point where the latter duct crosses the artery. The ovarian artery may also be readily found, isolated, and ligated. The artery supplying the round ligament will be identified at the lower angle of the wound as it enters the canal with the cord, but as it is difficult to separate and tie it, it is better to ligate the inferior epigastric, of which it is a branch.

[This operation must strike the surgical reader as not only too heroic for a mere palliative measure, but as unscientific. It is certainly unjustifiable to

subject a patient, reduced by advanced carcinoma, to such an operation, and in cases of uterine hemorrhage from other causes in which radical treatment is indicated, it would seem more rational to open the abdomen and remove the whole or a portion of the uterus, previously ligating the vessels within the broad ligaments according to Stimson's method.—ED.]

REMOVAL OF AN UNSUSPECTED EXTRA-UTERINE PREGNANCY AFTER INCISION OF A RETRO-UTERINE HÆMATOCELE.

ROSE (*Deutsche med. Wochenschrift*, June 13, 1889) reports the case of a woman who had been married for ten years and remained sterile. She had menstruated three weeks before she came to the hospital, and was excessively anæmic at the time of entrance. On vaginal examination a hard tumor was felt filling Douglas's pouch and compressing the rectum and vagina. There was a soft spot at its most dependent portion, and the patient showed evidences of commencing peritonitis. An incision was made through the fornix vaginæ into the mass, and a quantity of old coagula was removed, in the midst of which was found a fœtus as long as the finger. The patient succumbed, and at the autopsy a ruptured ectopic sac was found.

[This case illustrates very forcibly the remote danger incurred by a patient who may recover from the immediate results of a ruptured tubal pregnancy. In a similar case, occurring in the Editor's practice, with an equally negative history, the diagnosis was cleared up by the discharge of fœtal bones through a fistulous opening in the vaginal roof, the patient making a perfect recovery.—ED.]

THE BEST MATERIAL FOR INTRA-PERITONEAL SUTURES.

THOMSON, of Dorpat (*Centralblatt für Gynäkologie*, June 15, 1889), reports the result of a series of interesting experiments upon animals, made with the view of determining what material is least irritating when introduced into the peritoneal cavity in the form of sutures, especially in the operation of Cæsarean section.

The sutures were prepared in the following manner: Silkworm-gut was dipped in a solution of bichloride, 1 to 1000, immediately before being used, the silk being boiled for an hour in the same solution and then kept in absolute alcohol or a five-per-cent. solution of carbolic acid. The chromicized catgut was prepared according to Leopold's method, the raw gut being soaked for forty-eight hours in a ten-per-cent. solution of carbolized glycerine, then for five hours in a one-half-per-cent. solution of chromic acid, and finally immersed in absolute alcohol. The carbolized catgut was first treated with a strong sublimate solution, and then immersed in carbolized oil (twenty per cent.). In every instance the suture was placed in a five-per-cent. solution of carbolic acid immediately before it was used.

The sterilization of the sutures was proved by introducing portions of them into gelatin; chromicized and carbolized catgut caused clouding of the gelatin in a few cases, especially when the carbolized gut was frayed out, showing that its deeper portions were not aseptic. The latter fact was of importance as bearing upon the question of late infection from sutures after the strands have become separated through softening. No cultures were obtained from the prepared

silk. Ordinary raw catgut caused liquefaction of the gelatin within thirty-six hours. Rabbits, cats, and dogs were made the subjects of the experiments, which consisted in opening the abdomen, making incisions in the fundus uteri, and closing them with the various sutures above mentioned; sutures were also inserted in the omentum and in the wound in the peritoneum. The sutures were left *in sitû* for various periods, when the animals were killed and their abdomens was reopened. It was found that the carbolized catgut was partially absorbed at the end of ten days, and completely at the end of seventeen; the chromicized and silkworm-gut was intact at the expiration of sixty-four days, the former being more or less encysted. The silk sutures were unchanged after remaining in sitû for two weeks, but were almost entirely absorbed at the end of nine weeks. No difference was observed in the condition of the uterine and peritoneal sutures.

The deductions from these experiments are: 1. Silk is the best material for sutures, because it can be absolutely sterilized and is eventually absorbed. 2. Chromicized catgut, silkworm-gut, and silver wire, not being absorbed, are unsuitable for intraperitoneal or uterine sutures. 3. Catgut, however prepared, should be rejected on account of its liability to carry infection; carbolized gut should not be used to close large peritoneal wounds, because it is absorbed too quickly.

Hæmatosalpinx.

At a recent meeting of the Berlin Obstetrical and Gynecological Society (*Centralblatt für Gynäkologie*, No. 24), Paul Ruge presented a specimen of hæmatoma of the Fallopian tube, which before operation was supposed to be an ectopic gestation, as the patient presented the symptoms and physical signs characteristic of that condition. It was carefully examined by Carl Ruge, who held that it was not an extra-uterine pregnancy. An interesting discussion followed, Veit claiming that the absence of chorionic villi did not militate against the diagnosis of pregnancy, while the fact that the blood-clot was adherent at a single point on the wall of the tube was in favor of the same. He had operated twelve times for extra-uterine pregnancy, and in three of these cases the patient had a return of the trouble in the opposite tube. Ruge said that he had found no microscopical appearances that justified him in regarding the specimen anatomically as other than one of hæmatosalpinx. Dührssen affirmed that he had seen similar effusions of blood into the tube as the result of the injudicious practice of massage, when there was no possibility of the condition being extra-uterine pregnancy.

Partial Removal of the Ovaries and Tubes.

A. Martin (Volkmann's *Sammlung klinischer Vorträge*, No. 343) credits Schroeder with the first attempt to remove only the diseased portion of an ovary, leaving the healthy part. Martin has practised the same operation and has extended it to the removal of portions of the tubes. Of ten cases of partial extirpation of the ovary, conception subsequently took place in thirty per cent. In seven cases the adherent, but otherwise healthy, tube was freed from its adhesions, and the patency of the lumen having been demonstrated, the infundibulum was brought in contact with the corresponding ovary so

as to insure the passage of the ova into the tube. All the seventeen patients recovered.

The writer summarizes as follows:

1. Partial removal of diseased portions of the ovary does not affect recovery from the operation.

2. Excision of the closed, or otherwise diseased portion of the tube does not affect the healing process.

3. Women who have suffered such partial removal of the adnexa are no more liable to an extension of the disease to the healthy portion of the resected organs than are women whose ovaries and tubes are normal.

4. In all these cases of excision menstruation persists and conception is possible.

Pelvic Massage.

Papers on this subject were read by Boriakowski, Halberstamm, and Semiamkoff at the third meeting of the Russian Medical Congress (*Wratsch*, No. 2, 1889). The first-named writer has found that massage is most valuable in promoting the disappearance of extra-peritoneal exudates; his results in cases of intra-peritoneal exudations have been less positive. He does not believe that massage will take the place of the ordinary methods of treating prolapsus uteri.

Halberstamm's observations in twenty-one cases have led him to the following conclusions: 1. Subacute and chronic parametric exudates become absorbed more rapidly under the massage treatment than with any other method; peritonitic adhesions, which rarely contain much firm cicatricial tissue, readily stretch under the manipulations; 2. Prolapse of the uterus is relieved by reducing its weight by massage and then strengthening the relaxed ligaments by systematic elevation of the organ; 3. Retroversion or flexion of the uterus, without fixation, may be successfully treated by massage, provided the uterine ligaments still contain muscular fibres.

Semiamkoff's observations were made in Slavjansky's clinic, twenty-eight patients being treated during the course of seven months. He met with greatest success in applying massage to old peri-uterine adhesions, although retroflexion of the uterus was not cured. In the majority of the cases in which massage was practised at the time of the menstrual flow dysmenorrhœa was either cured or considerably relieved. The writer recommends the treatment enthusiastically, and has never observed any bad results from it, even in cases of subacute inflammation where the evening temperature was 101° (!). Massage, he says, is successful in sixty per cent. of the cases, and is preferable to all other non-surgical methods of treatment by reason of its beneficial effect upon the general nutrition, as well as the local lesion.

The Flap-splitting Operation for Lacerated Perineum.

Mundé's practical paper on this subject, with its admirable illustrations (*Amer. Journ. of Obstetrics*, July, 1889), will serve to render this operation more intelligible to American readers than it has been hitherto. He uses sutures of silkworm-gut, introducing them through the skin at the edges of the wound, instead of just within its margin, as Tait directs. The bowels are

moved on the third day, the patient being allowed to pass her urine. The advantages of the operation, which is applicable equally to complete and incomplete lacerations, are: Celerity, simplicity, greater certainty of success in cases of complete laceration, and the fact that no tissue is removed, so that in the event of failure the patient's condition is as good as it was before. Since neither the vaginal nor the rectal mucosa is punctured, there is less liability to the formation of a fistula than in either of the old operations.

The important caution is added that the flap-splitting operation is not adapted to cases in which there is extensive rectocele.

[This brief paper deserves careful study, since we have previously had but a hazy idea of the operation which it so lucidly describes.—ED.]

INTRA-UTERINE THERAPEUTICS.

MARY PUTNAM JACOBI, in the same journal, concludes an elaborate paper on this subject, her deductions being as follows: Cauterization of the endometrium is really a sort of counter-irritation, since it causes dilatation of the bloodvessels at a point distant from the seat of irritation. Hence intra-uterine applications may modify the circulation and innervation of the peri-uterine tissues, and are dangerous according to the amount of existing hyperæmia in those tissues. This is especially noticeable in cases in which intra-uterine medication is practised just before or after the menstrual period. The post-menstrual week is the period of danger. Not more than *one* intra-uterine application should be made in the month, until tolerance has been established, and as many as *three* only in exceptional cases.

Intra-uterine medication should be regarded in the same light as a minor gynecological operation, hence applications to the corporeal endometrium ought usually to be made at the patient's house, the woman remaining in bed "from six hours to six days (!), according to the severity of the reaction." Dilatation of the canal with steel instruments is advisable if it is not readily pervious. With regard to the choice of medicaments, the writer thus summarizes: "When it is desired to obtain the remote effect on the parenchymatous circulation of the uterus which results from cauterization of the endometrium, iodine tincture or iodized phenol is required. When a superficial action is required on abraded hyperæmic surfaces, or on ulcers with papillary granulations, iodoform is preferable."

[While we would not question the theoretical deductions of such a careful observer as Dr. Jacobi, we cannot avoid calling attention to the fact that many gynecologists of wide clinical experience will differ from her with regard to the serious effects of intra-uterine medication as employed in ordinary office practice.—ED.]

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